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NTISearch

NTIS/PS-77/0756

**Anthropometry: Basic Studies and Applications
Volume 1. 1964 - 1975**

A Bibliography with Abstracts

Search period covered

1964 - 1975

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NTIS

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National Technical Information Service
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15. Supplementary Notes			
16. Abstracts Research studies are abstracted relative to anthropometric measurements for use in designing military and civilian protective equipment and clothing, automobile interiors and air bag restraint systems, aircraft cabins, and aircraft seats. In addition, reports are cited on design of anatomical models, computerized simulation of the human body, and anthropometry as related to the strength of body members and physical fitness. (This updated bibliography contains 208 abstracts, none of which are new entries to the previous edition.)			
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<u>Title</u>	<u>Corporate Author</u>	<u>Sponsoring Agency</u>	<u>Report Date</u>	<u>Pages in Report</u>	<u>NTIS Subject Categories</u>
Compilation of State Data for Eight Selected Toxic Substances. Volume I	Mitre Corp., McLean, Va.	*Environmental Protection Agency, Washington, D.C.			
	Office of Toxic Substances.	(402 364)			

Final rept.

AUTHOR: Roberts, Elisabeth, Spewark, R., Stryker, S., Tracey, S.
 C5945F4 FLD: 06T, 06F, 57Y*, 57H, 68* USGRDR7606
 Sep 75 165p*

REPT NO: MITRE-75-52-Vol-1

CONTRACT: EPA-68-C1 2933

MONITOR: EPA/560/7-75/001-1

Paper copy also available in set of 5 reports as PB-248 659-SET, PC\$36.00.

ABSTRACT: In June 1974, toxic substances data in the U.S. was collected and analyzed in 20 key states. This report describes that effort and discusses the amount, type and usefulness of the data and the toxic substances monitoring capabilities of the state agencies contacted.

DESCRIPTORS: *Environmental surveys, States (United States), Monitors, Toxicology, Arsenic, Beryllium, Cadmium, Cyanides, Lead(Metal), Mercury(Metal), Chlorine aromatic compounds, Data acquisition, Data processing, Water pollution, Air pollution, Chemical compounds

IDENTIFIERS: *Toxic agents, Biphenyl/chloro, State agencies, NTISEPAOTS

PB-248 660/3ST NTIS Prices: PC\$6.75/MF\$3.00

Paper Copy
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NOTE: Prices are subject to change. See colored pages in back of search for current price list.

Investigation of Inertial Properties of the Human Body

Aerospace Medical Research Lab Wright-Patterson AFB Ohio*National Highway Traffic Safety Administration, Washington, D.C.*Webb Associates, Inc., Yellow Springs, Ohio. (009850)

Final rept. Apr 72-Dec 74

AUTHOR: Chandler, R. P., Clauser, C. E., McConville, J. T., Reynolds, H. M., Young, J. W.

C5511A1 FLD: 6S, 1B, 57W*, 85D* GRAI7526

Mar 75 178p

REPT NO: AMRL-TR-74-137

CONTRACT: DOT-HS-017-2-315

MONITOR: DOT-HS-801-430

ABSTRACT: Knowledge of the anthropometric parameters of the human body is essential for understanding of human kinetics and particularly for the design and testing of impact protective systems. Considerable information is available on the size, weight and center of mass of the body and its segments. This report supplements existing information with data regarding mass distribution characteristics of the human body as described by the principal moments of inertia and their orientation to body and segment anthropometry. The weight, center of mass location and principal moments of inertia of six cadavers were measured, the cadavers were then segmented and the mass, center of mass, moments of inertia and volume were measured on the fourteen segments from each cadaver. Standard and three-dimensional anthropometry of the body and segments was also determined.

DESCRIPTORS: *Biomechanics, *Anthropometry, *Inertia, Humans, Mass, Mathematical models, Impact shock, Protective equipment, Human factors engineering

IDENTIFIERS: *Biodynamics, Design, DOT/5H, NTISDODAF, NTISDODFAA, NTISDOTFAA, NTISDOTHTS

AD-A016 485/5ST NTIS Prices: PC\$7.00/MF\$2.25

Anthropometric Dimensions Representative of Average Three and Six Year Old Children Sizes for the Construction of Mastermodel Body Forms

Michigan Univ., Ann Arbor. Highway Safety Research Inst.*Civil Aeromedical Inst., Oklahoma City, Okla.*National Highway Traffic Safety Administration.*Webb Associates, Inc., Yellow Springs, Ohio. (407 825)

Final rept. Sep 74-Apr 75

AUTHOR: Young, J. W., McConville, J. T., Reynolds, H. M., Snyder, R. G.

C5384G2 FLD: 06N, 13B, 95D, 85D, 85B, 91B GRAI7524

10 Apr 75 35p

CONTRACT: NHTSA-5-1494

MONITOR: DOT-HS-801-638

Prepared in cooperation with Webb Associates, Inc., Yellow Springs, Ohio.

ABSTRACT: Master model Body Forms were created to reflect the size and shape of the average three and six year old children. The mastermodels were erected on the basis of available U.S. population data and/or estimates interpolated from such data and on the basis of the collective judgment of a panel of experts in anthropometry. Ninety-eight dimensions were generated to describe the external morphology of the children. The description includes dimensions and definitions for each of the measurements as well as the associated landmark definitions. A bibliographical reference used for collation of child anthropometry and a list of other selected references are included.

DESCRIPTORS: *Anthropometry, *Children, *Anatomical models, Measurement, Safety devices, Passenger vehicle, Highway transportation

IDENTIFIERS: *Child restraint systems, Restraint systems, NTISDOTHTS, NTISDOTFAA

PB-244 797/7ST NTIS Prices: PC\$3.75/MF\$2.25

Biomechanical Analysis of the U.S. Navy Mark V and Mark XII Diving Systems

Naval Medical Research Inst Bethesda Md*Bureau of Medicine and Surgery, Washington, D.C. (249650)

Medical research progress rept.

AUTHOR: Bachrach, Arthur J., Egstrom, Glen H., Blackmun, Susan M.

C5364H2 FLD: 6Q, 95D, 95E GRAI7524

1975 10p

PROJECT: M4306

TASK: M4306-03

MONITOR: 18

Availability: Pub. in Human Factors, v17 n4 p328-336 1975.

ABSTRACT: This study is one of a series of human factors analyses comparing two U.S. Navy surface-supported hardhat diving systems--the standard Mark V and the prototype Mark XII. The study assessed the range of motion in the two diving systems, using a biomechanical analysis. Fourteen anthropometric measurements were chosen which represented gross body movements used in hardhat diving and likely to be affected most by diving suits. After measuring each movement, comparisons were made with swim suit baselines to determine how much loss of mobility had occurred. The Mark XII was superior to the Mark V overall, both in wet and dry modes. (Author)

DESCRIPTORS: *Diver equipment, *Protective clothing, *Human factors engineering, Anthropometry, Motion, Mobility, Measurement, Comparison, Reprints

IDENTIFIERS: *Diving suits, Mark-5 diving systems, Mark-12 diving systems, NTISDODXR, NTISDODN

AD-A015 418/7ST NTIS Prices: PC\$3.25/MF\$2.25

Quantitative Respirator Man-Testing and Anthropometric Survey

Dow Chemical U.S.A., Golden, Colo. Rocky Flats Div. (9500185)

AUTHOR: Leigh, J. D.

C5351L2 FLD: 18F, 06Q, 77F, 57U, 95D NSA3205

22 May 75 12p

CONTRACT: AT(29-1)-1106

MONITOR: 18

ABSTRACT: Results are reported of a recent anthropometric survey and test procedures related to the respiratory protection program to safeguard the health of personnel. Respiratory protection procedures involve the selection of face masks worn by plant personnel. The fitting, handling, and use of face masks through explicit instructions can assure optimum protection. Comparisons are made with the test-panel selection parameters established by the Los Alamos Scientific Laboratory in Los Alamos, New Mexico, and recommendations by Webb Associates of Yellow Springs, Ohio.

DESCRIPTORS: (*Respirators, *Performance testing), (*Face, *Configuration), Air, Dusts, Filters, Nuclear facilities, Radiation protection, Respiration, Rocky flats plant

IDENTIFIERS: NTISERDA

RFP-2358 NTIS Prices: PC\$4.00/MP\$2.25

High Acceleration Cockpit Controller Locations. Volume II. Test Plan

Mcdonnell Aircraft Co St Louis Mo*Air Force Flight Dynamics Lab.,
Wright-Patterson AFB, Ohio. (403111)

Final technical rept. Jun-Dec 74
AUTHOR: Asiala, C. F., Loy, S. L.
C5293F2 FLD: 1C, 5H, 51C GRAI7523
May 75 80p
REPT NO: MDC-A2960-Vol-2
CONTRACT: F33615-74-C-3093
PROJECT: AF-6190
TASK: 619003
MONITOR: AFFDL-TR-75-58-Vol-2
See also Volume 3, AD-A014 812.

ABSTRACT: A high acceleration cockpit/controller design and integration program was conducted, using a full scale design aid. Alternate cockpit/controller configurations were developed for comparison using this full scale design aid in a formally structured evaluation including mission related task elements. Crew station and controller characteristics were thus related to operator needs in a mission context for advanced fighter concepts. (Author)

DESCRIPTORS: *Pilot seats, *Flight instruments, *Cockpits, Positioning reactions, Setting(Adjusting), High acceleration, Flight maneuvers, Pilots, Aerial warfare, Job analysis, Man machine systems, Throttling, Control panels, Jet fighters, Experimental design, Flight simulation, Human factors engineering, Display systems, Visual perception, Area coverage, Integrated systems, Anthropometry, Mission profiles, Flight control systems, Instrument panels

IDENTIFIERS: *Reclining pilot seats, High acceleration cockpits, NTISDODXA, NTISDODAF

AD-A014 811/4ST NTIS Prices: PC\$4.75/MF\$2.25

High Acceleration Cockpit Controller Locations. Volume III. Onsite Pilot Evaluations

Mcdonnell Aircraft Co St Louis Mo*Air Force Flight Dynamics Lab.,
Wright-Patterson AFB, Ohio. (403111)

Final technical rept. Jun-Dec 74
AUTHOR: Mattes, R. E., Asiala, C. F.
C5293F3 FLD: 1C, 5H, 51C GRAI7523
May 75 43p
REPT NO: MDC-A2960-Vol-3
CONTRACT: F33615-74-C-3093
PROJECT: AF-6190
TASK: 619003
MONITOR: APFDL-TR-75-58-Vol-3
See also Volume 1, AD-A014 810.

ABSTRACT: A High Acceleration Cockpit evaluation program was conducted for an advanced fighter concept. Program effort included evaluations within the context of a mission scenario by a total of 40 operational pilots in a static design aid. Various specific areas of concept were evaluated as well as the overall need/utility of the crew station. Resulting measures allowed identification of those areas where future R/D effort should be focused.

DESCRIPTORS: *Pilot seats, *Flight instruments, *Cockpits, Setting(Adjusting), High acceleration, Flight maneuvers, Pilots, Acceleration tolerance, Aerial warfare, Job analysis, Man machine systems, Acceptability, Control panels, Throttling, Jet fighters, Mission profiles, Human factors engineering, Display systems, Visual perception, Area coverage, Integrated systems, Questionnaires, Air Force personnel, User needs, Anthropometry, Flight control systems, Instrument panels

IDENTIFIERS: *Reclining pilot seats, High acceleration cockpits, NTISDODXA, NTISDODAF

AD-A014 812/2ST NTIS Prices: PC\$3.75/MF\$2.25

The Driving Seat. Its Adaptation to Functional and Anthropometric Requirements

Royal Aircraft Establishment, Farnborough (England).

AUTHOR: Rebiffe, R.

C5273L4 FLD: 05H, 95D STAR1318

May 75 22p

REPT NO: RAE-LIB-TRANS-1841, BR48031

MONITOR: 18

Tran-Transl. Into English from the French.

ABSTRACT: The relationship of the drivers seat with the various functions to be carried out from the driving position was considered. The study included: (1) analysis of the drivers task, (2) determination of the body posture which best meets the task requirements, and (3) definition of the seat characteristics giving optimum support to the driver in this posture. The main characteristics of the seat obtained were the seating height, the location and extent of the adjustment zone, the seat back inclination, the cushion inclination, and the static consistency of the cushion. (Author)

DESCRIPTORS: *Anthropometry, *Automobiles, Design analysis, Posture, Seats, Sitting position

IDENTIFIERS: NTISNASA

N75-27764/GST NTIS Prices: PC\$3.25/MF\$2.25

Influence of Various Acceleration Environments on the Ability to
Activate Controls for Emergency Devices

Naval Air Development Center Warminster Pa Crew Systems Dept (496610
)

Phase rept.

AUTHOR: Fessenden, Emma

C5231D1 PLD: 6G, 5E, 1C, 51 GRAI7522

17 Jul 75 24p

REPT NO: NADC-75079-40

PROJECT: WF41-451

TASK: WF41-451-402

MONITOR: 18

ABSTRACT: A series of experiments were performed which used the performance ability of aircrewmembers in activating emergency devices to develop test and evaluation methods for emergency control devices under acceleration environments. Environments of realistic emergency situations were dynamically simulated in the human centrifuge. The interaction between various devices and their location with the environment was analyzed. Anthropometric correlation with failure to activate the emergency control device is given. The method of analyses is described and results of the experiments are presented. (Author)

DESCRIPTORS: *Human factors engineering, *Ejection seats, Flight crews, Emergencies, Performance(Human), Centrifuges, High acceleration, Actuators, Degradation, Adverse conditions, Anthropometry, Control systems, Position(Location), Flight maneuvers, Naval aircraft, Delay, Spinning(Motion), Experimental design

IDENTIFIERS: NTISDODXA, NTISDODN

AD-A014 545/8ST NTIS Prices: PC\$3.25/MF\$2.25

A Review of Anthropometric Data of German Air Force and United States
Air Force Flying Personnel, 1967 - 1968

Advisory Group for Aerospace Research and Development, Paris (France).

AUTHOR: Grunhofer, H. J., Kroh, G.

C5192K1 PLD: 05E, 95D STAR1317

Apr 75 180p

REPT NO: AGARD-AG-205, AGARDOGRAPH-205

MONITOR: 18

ABSTRACT: Standardized equipment, definitions and procedures were used according to Hertzberg for each program. Both data collections were obtained from preselected personnel and are not representative of the whole male population of the respective country; however, the results are representative of the reference collectives. For each body dimension the following detailed information is given: the definition, written and illustrated, of body dimension to be measured; the frequency of certain ranges; a breakdown of GAF and USAF data in percentile; essentials on the statistics of data distribution. The correlation matrix of GAF data is also included. (Author)

DESCRIPTORS: *Anthropometry, *Armed forces, *Body size (Biology), Data correlation, Flight crews, Flying personnel, Germany, Human factors engineering, Males

IDENTIFIERS: NTISNASA

N75-26635/3ST NTIS Prices: PC\$7.00/MP\$2.25

Anthropometry of Airline Stewardesses

Federal Aviation Administration Washington D C Office of Aviation
Medicine (264320)

AUTHOR: Snow, Clyde C., Reynolds, Herbert M., Allgood, Mackie A.

C5023A1 FLD: 5E, 1B, 95D, 85D, 85A GRAI7519

Mar 75 107p

REPT NO: FAA-AM-75-2

MONITOR: 18

ABSTRACT: The report presents the body measurements of 423 stewardess trainees enrolled in the American Airlines Stewardess Training Academy in Fort Worth, Texas, between February and June 1971. It includes the means, standard deviations, coefficients of variation, percentiles, and related statistics of 72 standard anthropometric and functional measurements. The survey was initiated to provide adequate criteria for improving the emergency equipment availability and workspace design for the stewardess.

DESCRIPTORS: *Anthropometry, *Females, *Flight crews, Surveys, Texas, Human factors engineering, Emergencies, Work, gn, Aviation medicine, Tables(Data), Measurement

IDENTIFIERS: Workplace layout, Design, NTISDODFAA

AD-A012 965/OST NTIS Prices: PC\$5.25/MF\$2.25

Physical Characteristics of Children as Related to Death and Injury
for Consumer Product Safety Design

Michigan Univ., Ann Arbor. Highway Safety Research Inst.*Consumer
Product Safety Commission, Washington, D.C.*Food and Drug
Administration, Washington, D.C. (407 825)

Final rept. Apr 72-31 Mar 75

AUTHOR: Snyder, R. G., Spencer, N. L., Owings, C. L., Schneider, L. W.
C4911J1 FLD: 05E, 95D*, 96D* GRAI7517

31 May 75 241p*

REPT NO: UM-HSRI-BI-75-5

CONTRACT: FDA-72-70

MONITOR: 18

Sponsored in part by Consumer Product Safety Commission, Washington,
D.C.

ABSTRACT: A total of 41 body measurements were taken on 4027 infants and children representing the U.S. population from 2 weeks to 13 years old using specially modified anthropometers, calipers, and girth devices. These devices utilize a 10-turn potentiometer for electrical readout of length. A miniature pressure transducer in the paddle blades of the anthropometers and calipers provides for standardizing measurements on soft tissue. Measurement data were recorded automatically by a portable NOVA 1220 mini-computer system. Center of gravity in standing and sitting position was also obtained. Other devices were utilized for obtaining finger diameters, hand clearance, and grip size dimensions. Data are presented in both tabular and graphical format giving the mean, S.D., 5th, 50th, and 95th percentiles and number of measurements (N) for each age interval.

DESCRIPTORS: *Children, *Anthropometry, *Product development,
*Measuring instruments, Human body, Infants, Consumers, Computers,
Potentiometers(Instruments), Center of gravity, Tables(Data), Data
acquisition, Injuries, Human factors engineering

IDENTIFIERS: *Product safety, Consumer products, Consumer protection,
NTISHSRI

PB-242 221/OST NTIS Prices: PC\$7.50/MF\$2.25

Anthropometry and Kinematics in Crew Station Design

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009800)

AUTHOR: Kennedy, Kenneth W.

C4891F1 FLD: 1C, 5E, 6N GRAI7517

Jul 73 17p

REPT NO: AMRL-TR-72-75

MONITOR: 18

ABSTRACT: Attention to the anthropometric and kinematic characteristics of the aircrew member is essential to good cockpit design. The design problems are many in which anthropometric and kinematic variability must be accommodated. Many are crucial to the safety of the pilot and to the success of the mission. The condition of current anthropometric and kinematic data is reviewed.

DESCRIPTORS: *Cockpits, *Anthropometry, *Safety, Human factors engineering, Kinematics, Pilots, Flight crews

IDENTIFIERS: Design standards, NTISDODAF

AD-A011 581/6ST NTIS Prices: PC\$3.25/MF\$2.25

The Effects of Personal Protective Equipment Upon the Arm-Reach Capability of USAF Pilots

Webb Associates Inc Yellow Springs Ohio*Aerospace Medical Research Lab., Wright-Patterson AFB, Ohio. (401286)

AUTHOR: Alexander, Milton, Laubach, Lloyd

C4891E4 FLD: 5E, 1C, 74E, 95D, 51C GRAI7517

Jul 73 10p

CONTRACT: F33615-72-C-1006

PROJECT: AF-7184

TASK: 718408

MONITOR: AMRL-TR-72-93

Pub. in Proceedings of the Interagency Conference on Management and Technology in the Crew System Design Process, Los Angeles, on 12-14 September 1972.

ABSTRACT: The lack of published arm-reach data on Air Force flight personnel in actual cockpit situations presents manifest difficulties to the cockpit layout specialist. This paper discusses the results of a study to determine the arm-reach capabilities of aircrewmembers wearing heavy winter flight clothing, survival equipment, and restraint harnesses. The sample consisted of 16 male subjects (currently active Air Defense Command pilots). The subjects were (pilots) selected to approximate closely the various height-weight categories in the ADC flying population. A specially designed apparatus was constructed to measure arm-reach capability. Each subject was measured under four conditions. The results of the study indicate that there are significant differences in arm-reach capability of pilots while in the shirt-sleeved and maximum flying assembly conditions throughout most of the spatial envelope.

DESCRIPTORS: *Human factors engineering, *Cockpits, *Pilots, Flight clothing, Air Force equipment, Flight crews, Winter, Survival equipment, Simulation, Test methods, Test facilities, Anthropometry

IDENTIFIERS: *Arm reach capabilities, NTISDODAF

AD-A011 580/8ST NTIS Prices: PC\$3.25/MF\$2.25

Human Force Capabilities for Operating Aircraft Controls at 1, 3, and 5 g_z

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

Final rept.

AUTHOR: Kroemer, K. H. Eberhard

C4885I1 FLD: 5H, 1C, 95D GRAI7517

Feb 75 107p

REPT NO: AMRL-TR-73-54

PROJECT: AF-7184

TASK: 718408

MONITOR: 18

ABSTRACT: The maximum isometric forces adult male subjects could exert at eight locations of hand-operated aircraft controls were measured at 1, +3 and +5g_z. Forces were measured in two vertical and four to eight horizontal directions. Selected anthropometric dimensions were obtained on the subjects and compared with those from the 1967 USAF anthropometric survey of flying personnel. Summary statistics including the mean, standard deviation, coefficient of variation, symmetry, kurtosis, and selected percentiles, are presented for each of the 60 force exertion measures.

DESCRIPTORS: *Man machine systems, *Flight control systems, *Biomechanics, Males, Aircraft, Aerospace medicine, Anthropometry, Acceleration tolerance, Tables(Data), Statistics, Flight crews, Strength(Physiology), Human factors engineering, Operators(Personnel)

IDENTIFIERS: NTISDODAF

AD-A011 545/1ST NTIS Prices: PC\$5.25/MF\$2.25

A Review of Anthropometric Data of German Air Force and United States Air Force Flying Personnel 1967-1968

Advisory Group for Aerospace Research and Development Paris (France)
(400043)

AUTHOR: Grunhofer, H. J., Kroh, G.

C4821B4 FLD: 5E, 95D GRAI7516

Apr 75 180p

REPT NO: AGARD-ograph-205

MONITOR: 18

NATO furnished.

ABSTRACT: The present study contains anthropometric data of GAF and USAF flying personnel. The data for USAF flying personnel were taken from measurements of 2420 subjects in 1967. The results of this measurement series, which so far have not been published, have been provided by E. Shurchill. These data represent the latest state of anthropometric surveys of American flying personnel. A comparison of anthropometric data requires that the individual dimensions be measured by the same method. To assure this, the GAF IAM team used equipment, definitions and procedures according to Hertzberg. For each body dimension the following detailed information is given: (1) The definition, written and illustrated, of body dimension to be measured; (2) The frequency of certain ranges; (3) A breakdown of GAF and USAF data in percentile, permitting comparison; (4) Essentials on the statistics of data distribution. To facilitate further anthropometric studies the correlation matrix of GAF data has been added in the appendix. The tables contain the correlation coefficients of any anthropometric body dimension with any other listed in this study.

DESCRIPTORS: *Anthropometry, *Flight crews, Air Force, France, Reviews, Germany(East and West), Tables(Data), Human factors engineering, United States, Data acquisition, NATO

IDENTIFIERS: NTISDODSD

AD-A010 674/OST NTIS Prices: PC\$7.00/MF\$2.25

Development of an Advanced Passive Restraint System for Subcompact Car Drivers

Minicars, Inc., Goleta, Calif.*National Highway Traffic Safety Administration, Washington, D.C.

Final rept. Jun 73-Nov 74

AUTHOR: Fitzpatrick, Michael

C4792A2 FLD: 13L, 13F, 85D, 95D, 96D USGRDR7515

Apr 75 225p

CONTRACT: DOT-HS-113-3-742

MONITOR: DOT-HS-113-3-742

ABSTRACT: The report summarizes the analyses, design, and testing that were conducted to develop an air bag restraint system for the subcompact car capable of protecting the driver in frontal and frontal oblique crashes up to 50 mph. A small, rapidly inflating dual air bag mounted to a stroke efficient energy absorbing steering column, was developed. The lower body energy is absorbed by a crushable knee restraint fabricated of styrofoam. The system ultimately proved capable of protecting subcompact car drivers throughout the adult anthropometric size range at velocities exceeding 50 mph. In addition, the finalized restraint system is constructed of components that are oriented toward eventual mass production.

DESCRIPTORS: *Safety devices, *Passenger vehicles, Inflatable structures, Design, Collision research, Protection, Anthropometry, Crash tests

IDENTIFIERS: *Air bag restraint systems, *Compact cars, DOT/SA, DOT/4DZ/DB, NTISDOTHTS

PB-241 640/2ST NTIS Prices: PC\$7.50/MF\$2.25

Investigation of Inertial Properties of the Human Body

Aerospace Medical Research Lab., Wright-Patterson AFB, Ohio.*National Highway Traffic Safety Administration, Washington, D.C.*Civil Aeromedical Inst., Oklahoma City, Okla.*Webb Associates, Inc., Yellow Springs, Ohio. (009 850)

Final rept. Apr 72-Dec 74

AUTHOR: Chandler, R. F., Clauser, C. E., McConville, J. T., Reynolds, H. M., Young, J. W.

C4785J2 FLD: 05E, 95D USGRDR7515

Mar 75 168p

REPT NO: AMRL-TR-74-137

CONTRACT: DOT-HS-017-2-315-1A

MONITOR: DOT-HS-801-430

Prepared in cooperation with Civil Aeromedical Inst., Oklahoma City, Okla., and Webb Associates, Inc., Yellow Springs, Ohio.

ABSTRACT: Knowledge of the anthropometric parameters of the human body is essential for understanding of human kinetics and particularly for the design and testing of impact protective systems. Considerable information is available on the size, weight and center of mass of the body and its segments. The report supplements existing information with data regarding mass distribution characteristics of the human body as described by the principal moments of inertia and their orientation to body and segment anthropometry. The weight, center of mass location and principal moments of inertia of six cadavers were measured, the cadavers were then segmented and the mass, center of mass, moments of inertia and volume were measured on the fourteen segment from each cadaver.

DESCRIPTORS: *Body weight, *Inertia, *Anthropometry, Kinetics, Human factors engineering, Cadavers, Moments of inertia, Mass, Aerospace medicine, Tables(Data), Responses

IDENTIFIERS: DOT/5A, NTISDOTHTS

PB-241 566/9ST NTIS Prices: PC\$6.25/MP\$2.25

Arm-Reach Capability of USAF Pilots as Affected by Personal Protective Equipment

Webb Associates Inc Yellow Springs Ohio*Aerospace Medical Research Lab., Wright-Patterson AFB, Ohio. (401286)

Journal reprint

AUTHOR: Laubach, Lloyd L., Alexander, Milton

C4764L3 FLD: 6Q, 1C, 15E, 95D USGRDR7515

1974 11p

CONTRACT: F33615-75-C-5003

PROJECT: AF-7184

TASK: 718408

MONITOR: AMRL-TR-74-17

Presented at the Aerospace Medical Association Meeting, Mar 74.

Availability: Pub. in Aviation, Space and Environmental Medicine, v46 n4 p377-386 Apr 75.

ABSTRACT: Thirty-two USAF pilots participated in a study to determine the effects of personal protective equipment upon arm-reach capability. The reach envelope of each pilot was measured under two experimental conditions: (1) shirt-sleeved with the inertial reel unlocked; and (2) wearing complete winter flying assembly with the inertial reel locked. Selected descriptive statistics are presented for each of five angular positions. Arm-reach envelopes for various percentile values obtained for the two experimental conditions at 10 knob distances from the deck are shown. The results indicate that there are significant practical differences in arm-reach capability between the shirt-sleeved and the complete winter flying assembly conditions. (Author)

DESCRIPTORS: *Anthropometry, *Arms (Anatomy), Pilots, Flight clothing, Man machine systems, Winter, Restraint, Ejection seats, Configurations, Human factors engineering, Control knobs, Area coverage, Cockpits, Protective clothing, Reprints

IDENTIFIERS: Workplace layout, Arm reach, NTISDODAF

AD-A010 453/9ST NTIS Prices: PC\$3.25/MF\$2.25

Program Documentation for the Stick-Man Program

IBM Federal Systems Div Gaithersburg Md*Aerospace Medical Research
Lab., Wright-Patterson AFB, Ohio. (174950)

Program documentation

AUTHOR: Wartluft, D. L.

C4695G2 FLD: 5E, 9B USGRDR7514

Apr 70 62p

CONTRACT: F33615-69-C-1901

PROJECT: AF-7184

TASK: 718409

MONITOR: AMRL-HESS-70-3

ABSTRACT: The STICK-MAN Program was written for the Anthropology Branch (MRHA) of the Human Engineering Division, Aerospace Medical Research Laboratory (AMRL). Its function is to provide a means for studying the interrelationships between the mass and center of mass of the human body segments and the mass and center of mass of their component parts. The program utilizes an IBM 2250 Display Unit to enable the user to enter and modify parametric equations. The results are displayed numerically and also displayed graphically on a 'stick-man' view of the human body. Once the study is completed for a given subject, a hard copy printout of the results may be obtained. This program was written for an IBM System/360, Model 40 computer. Both assembler language and Fortran IV were used in coding the programs and Graphic Programming Services for the 2250 (GPS) was utilized for the graphics software support.

DESCRIPTORS: *Human factors engineering, *Computer programs, Computer applications, Computers, Computerized simulation, Human body, Anthropometry, Mass, FORTRAN

IDENTIFIERS: IBM 360 computers, FORTRAN 4 programming language, Stick Man program, NTISDODAF

AD-A009 559/6ST NTIS Prices: PC\$4.25/MF\$2.25

Basic Biomechanical Properties of the Human Neck Related to Lateral Hyperflexion Injury

Michigan Univ., Ann Arbor. Highway Safety Research Inst.*Insurance Inst. for Highway Safety, Washington, D.C. (407 825)

Final rept. 1 Nov 73-31 Dec 74

AUTHOR: Snyder, Richard G., Chaffin, Don B., Schneider, Lawrence W., Foust, David R., Bowman, Bruce M.

C4665F3 PLD: 06S, 57W USGRDR7513

15 Apr 75 311p

REPT NO: UM-HSRI-BI-75-4

MONITOR: 18

Prepared in cooperation with Insurance Inst. for Highway Safety, Washington, D.C.

ABSTRACT: Properties of the human neck which may influence a person's susceptibility to 'whiplash' injury during lateral impact have been studied in 96 normal subjects. Subjects were chosen on the basis of age, sex, and stature, and data were grouped into six primary categories based on sex (F,M) and age 18-24, 35-44, 62-74. Stature served as a secondary variable, with each group of 16 subjects being matched to obtain an average stature close to the 50th percentile for the category. The data include: measures of head, neck and body anthropometry in standing and normal seated positions; stretch reflex time of sternomastoid muscles; head/neck response to low-level acceleration, voluntary isometric muscle force in the lateral direction; and three-dimensional range of motion of the head and neck. Data are presented in a format applicable for biomechanical modeling of the seated human occupant and have been used in the MVMA-2D model adjusted for side impact at 10 and 30 mph to determine the influence of the measured properties of reducing 'whiplash' injury susceptibility.

DESCRIPTORS: *Neck(Anatomy), *Biomechanics, *Injuries, Anthropometry, Impact shock, Reflexes, Tolerances(Physiology), Models

IDENTIFIERS: *Whiplash injuries, Human body, NTISHSRI

PB-241 246/8ST NTIS Prices: PC\$9.25/MF\$2.25

Performance Evaluation of New Generation 50th Percentile
Anthropomorphic Test Devices - Volume II - Accelerator Sled Test Data

Calspan Corp., Buffalo, N.Y.*National Highway Traffic Safety
Administration, Washington, D.C. (407 727)

Final rept. Jun 73-Aug 74

AUTHOR: Massing, Daniel E., Naab, Kenneth N., Yates, Phyllis E.

C4663H3 FLD: 13F, 06N, 14B, 85B USGRDR7513

Mar 75 569p

REPT NO: CALSPAN-ZS-5352-V-3

CONTRACT: DOT-HS-053-3-664

MONITOR: DOT-HS-801-432

See also Volume 1, PB-240 920.

ABSTRACT: Four sled test configurations were employed to evaluate the dynamic performance repeatability of the GM 50X dummy. Type 2 belt, pre-inflated air bag, energy absorbing steering column, and Type 1 belt with simulated instrument panel test environments were utilized to measure the performance of two identically fabricated dummies. The graphical results of a statistical analysis is presented. In addition, graphical results of the energy absorbing steering column and simulated instrument panel tests of the GM 50X dummies are presented in raw form.

DESCRIPTORS: *Motor vehicles, *Anthropometry, Reliability, Tests, Rocket propelled sleds, Safety devices, Statistical analysis

IDENTIFIERS: DOT/5A, DOT/4DZ, NTISDOTHTS

PB-241 121/3ST NTIS Prices: PC\$13.00/MP\$2.25

Performance Evaluation of New Generation 50th Percentile
Anthropomorphic Test Devices. Volume I. Technical Report

Calspan Corp., Buffalo, N.Y.*National Highway Traffic Safety
Administration, Washington, D.C. (407 727)

Final rept. Jun 73-Aug 74

AUTHOR: Massing, Daniel E., Naab, Kenneth N., Yates, Phyllis E.

C4661A3 FLD: 06N, 13L, 13F, 85D, 95D, 96D USGRDR7513

~~Mar 75~~ 240p

REPT NO: CALSPAN-ZS-5352-V-2

CONTRACT: HS-053-3-664

MONITOR: DOT-HS-801-431

ABSTRACT: Two new generation anthropomorphic test dummies developed and designated as the GM-50X were experimentally evaluated to (1) determine the degree of conformance to the specifications contained in the 'Purchase Description of the NHTSA 50th Percentile Anthropomorphic Test Dummy' and (2) establish by sled testing in typical restraint and crash environments their potential for experimental repeatability. A series of eleven static and dynamic component tests were performed to measure the GM-50X dummies in accordance with the purchase description; the results indicate substantial non-conformance with the specified criteria.

DESCRIPTORS: *Automobiles, *Safety devices, *Anthropometry, *Crash tests, Safety belts, Safety engineering, Collision research, Rocket propelled sleds, Dynamic tests, Reliability

IDENTIFIERS: Air bag restraint systems, DOT/5D, DOT/5A, NTISDOTHTS

PB-240 920/9ST NTIS Prices: PC\$7.50/MF\$2.25

Whole Body Response Research Program

Michigan Univ., Ann Arbor. Dept. of Biomechanics.*General Motors Research Labs., Warren, Mich.

Final rept. 1 Jul 73-31 Aug 74

AUTHOR: Melvin, John W., BanSon, Joseph B., Alem, Nabin M.

C4595I1 PLD: 06S, 57W, 85D USGRDR7512

11 Mar 75 92p

REPT NO: UM-HSRI-BI-75-1

MONITOR: 18

Sponsored in part by General Motors Research Labs., Warren, Mich.

ABSTRACT: The general objectives of the program are to obtain data on human whole body kinematics under controlled test conditions which represent realistic automotive impact environments. The test subjects in the program are unembalmed male human cadavers which are suitably instrumented and subjected to the test environments at various levels of crash severity. Prior to testing, anthropometric measurements, including x-ray anthropometry, are made on each subject to quantify the subject's geometric characteristics and to locate the test instrumentation with respect to anatomical landmarks. The results of the test program are being analyzed to provide information for the development of scaling laws for percentile rating of response data and for prescribing performance requirements for dummy response evaluation.

DESCRIPTORS: *Kinematics, *Impact acceleration, *Collision research, *Biodynamics, Automobiles, Passenger vehicles, Humans, Cadavers, Anthropometry, X ray analysis, Responses, Simulation

IDENTIFIERS: NTISHSRI

PB-240 491/1ST NTIS Prices: PC\$4.75/MF\$2.25

An Anthropometric Survey of 2000 Royal Air Force Aircrew, 1970/71

Advisory Group for Aerospace Research and Development Paris (France)
(400043)

AUTHOR: Bolton, C. B., Kenward, M., Simpson, R. E., Turner, G. M.

C4545B1 FLD: 5E, 95D USGRDR7512

Dec 74 86p

REPT NO: AGARD-ograph-181

MONITOR: 18

NATO furnished.

ABSTRACT: The survey was undertaken to provide up-to-date information on the body measurements of Royal Air Force aircrew. This information is required for cockpit workspace and functional clothing sizing studies. A team of two trained measurers, using a specially designed anthropometric rig, took 63 body measurements of each of 2000 Royal Air Force aircrew between the ages of 18 and 45 at RAF stations in England. These measurements, recorded during an eighteen month period starting in January 1970, are summarized in the form of a percentile table, mean, standard deviation, range and coefficient of variation for each measurement. The statistical summary for each measurement together with a written description of the measuring procedure. The apparatus used is fully described and the organization of the survey is briefly discussed.

DESCRIPTORS: *Anthropometry, Human body, Flight crews, Air Force personnel, Surveys, Flight clothing, Cockpits, Human factors engineering

IDENTIFIERS: NTISDODSD

AD-A007 948/3ST NTIS Prices: PC\$4.75/MP\$2.25

A Study to Determine the Adequacy of the Tools and Equipment Used by
Air Force Women in the Craft Skills

Air Force Inst of Tech Wright-Patterson AFB Ohio School of Systems and
Logistics (012250)

Master's thesis

AUTHOR: Bolalek, Philip J., Grumblatt, Arthur G. Jr

C4361C2 FLD: 5E, 95D USGRDR7509

Jan 75 128p

REPT NO: SLSR-14-75A

MONITOR: 18

ABSTRACT: The tools and equipment now used in maintenance, electronics, and civil engineering, were designed to meet the needs of a totally male work force. This study addresses the adequacy of the tools and equipment for the women who are now working in these specialties. The method of approaching this potential problem was to obtain the opinions of the women working in these specialties through self-administered questionnaires. If more than ten percent of the respondents in a specialty considered a tool or equipment item to be inadequate, that item was considered inadequate for women in that specialty. Twenty-four items were identified as inadequate; six of these items were inadequate in more than one specialty. This study also collected data on the age, height, weight, and hand length of the women working in these specialties. In addition to the identification of inadequate tools and equipment for women, this study found that some of these items may also be inadequate for men. Additionally, potential problems were discovered with the quality of tools used in these specialties and with the suitability of women for these specialties.

DESCRIPTORS: *Tools, *Females, Air Force personnel, Anthropometry, Skills, Equipment, Requirements, Human factors engineering, Theses, Maintenance equipment, Electronics, Civil engineering

IDENTIFIERS: NTISDODAF

AD/A-006 342/OST NTIS Prices: PC\$5.75/MF\$2.25

Development of a Scientific Basis for Analysis of Aircraft Seating Systems

Ultrasystems Inc Phoenix Ariz Dynamic Science Div*National Aviation Facilities Experimental Center, Atlantic City, N.J. (408442)

Final rept. Aug 72-Apr 74

AUTHOR: Laananen, David H.

C4193B2 FLD: 1C, 1B, 6N, 85A, 85D, 95D USGRDR7507

Jan 75 226p

CONTRACT: DOT-FA72WA-3101

MONITOR: FAA-NA-74-175

ABSTRACT: A three-dimensional mathematical model of an aircraft seat, occupant, and restraint system has been developed as an aid to the development of crashworthy seats and restraint systems for general aviation aircraft. The occupant model consists of eleven rigid mass segments whose dimensions and inertial properties have been determined from studies of human body anthropometry and kinematics. The seat model is made up of beam and membrane elements with provision for simulating plastic behavior by the introduction of plastic hinges in the beams. A user-oriented computer program called Seat Occupant Model-Light Aircraft (SOM-LA) based on the three-dimensional model has been developed for use by engineers concerned with design and analysis of general aviation seats and restraint systems in that detailed descriptions of both are used as input. The response of the seat and occupant, restraint system loads, and various injury criteria are predicted for any given set of crash conditions.

DESCRIPTORS: *Aircraft seats, *Safety belts, *Anthropometry, Mathematical models, Commercial aircraft, Crashes, Aviation safety, Restraint, Loads(Forces), Computerized simulation, FORTRAN

IDENTIFIERS: DOT/5A, DOT/4DZ/DA, NTISDODFAA

AD/A-004 306/7ST NTIS Prices: PC\$7.50/MF\$2.25

Performance Characteristics of Anthropomorphic Dummy Joints

National Highway Safety Administration, Riverdale, Md. Safety Research
Lab.*National Highway Traffic Safety Administration, Washington, D.C.

Final technical rept. Feb 73-Jan 74

AUTHOR: Haffner, Mark P., Melton, Claude H.

C3995J1 PLD: 06N, 13F, 13L, 95D, 85D USGRDR7503

Oct 74 75p

MONITOR: DOT-HS-801-248

ABSTRACT: Three commercial anthropomorphic dummy joint assemblies have been evaluated for uniformity of torque response, repeatability, and angular velocity sensitivity. Description of test method and data reduction procedures are presented. Numerical criteria are proposed to characterize the performance of coulomb friction joint designs. A brief discussion of effects of applied torques external to the plane of motion is also included.

DESCRIPTORS: *Anthropometry, *Joints(Anatomy), *Anatomical models, Dynamic response, Consistency, Standardization, Validity, Torque, Sensitivity, Tests, Knee(Anatomy), Motor vehicle accidents

IDENTIFIERS: DOT/5D, DOT/4IZ/IY, NTISDOTHSA

PB-237 958/4ST NTIS Price: PC\$4.25/MF\$2.25

Anthropomorphic Test Dummy. Volume III. Design Data Package

General Motors Technical Center, Warren, Mich.*National Highway
Traffic Safety Administration, Washington, D.C. (389 622)

Final rept. 1 Dec 72-21 Dec 73.

C3992I1 FLD: 13L, 13F, 95D, 96D, 85D USGRDR7503

Oct 74 53p

CONTRACT: DOT-HS-299-3-569

MONITOR: DOT-HS-801-176

Paper copy also available in set of 3 reports as PB-237 655-SET,
PC\$17.00.

ABSTRACT: Volume III contains the information required to use and build the anthropomorphic test dummy. The user information includes descriptions, weights, ballasting procedures, adjustment information, and assembly instructions. Manufacturing requirements are detailed. Appendix A contains a complete parts list. Appendix C includes (under separate cover) complete engineering design drawings for manufacture and assembly of the Dummy.

DESCRIPTORS: *Automobiles, *Collision research, *Anthropometry,
*Anatomical models, Test equipment, Injuries, Design, Tests,
Performance evaluation

IDENTIFIERS: NTISDOTHTS

PB-237 658/OST NTIS Prices: PC\$4.25/MF\$2.25

Anthropomorphic Test Dummy. Volume II. Design, Development and Performance

General Motors Technical Center, Warren, Mich.*National Highway Traffic Safety Administration, Washington, D.C. (389 622)

Final rept. 1 Dec 72-21 Dec 73.

C3992H4 FLD: 13L, 13F, 95D, 96D, 85D USGRDR7503

Oct 74 405p

CONTRACT: DOT-HS-299-3-569

MONITOR: DOT-HS-801-175

Paper copy also available in set of 3 reports as PB-237 655-SET, PC\$17.00.

ABSTRACT: The report, Volume II of III, describes the design, development, and testing activities in the development of the anthropomorphic test dummy. The system tests used to assess the test dummy's repeatability and reproducibility (R and R) are discussed. Also, the need for rigorous test procedures and equipment for evaluating R and R is identified. Test performance shows that achieved R and R as evaluated by the head and chest SI's have a coefficient of variation of less than five percent. The test dummy's design is described including anthropomorphic and biomechanical consideration. Component biomechanical and hardware test procedures, equipment and test results are presented.

DESCRIPTORS: *Automobiles, *Safety engineering, *Anthropometry, *Anatomical models, Test equipment, Collision research, Injuries, Design, Tests, Performance evaluation

IDENTIFIERS: NTISDOTHTS

PB-237 657/2ST NTIS Prices: PC\$10.50/MF\$2.25

Anthropomorphic Test Dummy. Volume I. Program Summary-Background and Results

General Motors Technical Center, Warren, Mich.*National Highway Traffic Safety Administration, Washington, D.C. (389 622)

Final rept. 1 Dec 72-21 Dec 73.

C3992H3 FLD: 13L, 13P, 95D, 96D, 85D USGRDR7503

Oct 74 64p

CONTRACT: DOT-HS-299-3-569

MONITOR: DOT-HS-801-174

Paper copy also available in set of 3 reports as PB-237 655-SET, PC\$17.00.

ABSTRACT: The report in three volumes summarizes the design development and performance of an anthropomorphic test dummy. The many improved features of the Dummy are described. The marked improvement of repeatability and reproducibility of the Dummy are documented. The anthropometric and biomechanical basis of the design is described. Improvements of durability, maintainability, ease and cost of manufacture are treated. Improved system and component test procedures, equipment, and test results are presented.

DESCRIPTORS: *Automobiles, *Collision research, *Anthropometry, *Anatomical models, Test equipment, Safety devices, Injuries, Design, Maintainability, Performance evaluation

IDENTIFIERS: NTISDOTHTS

PB-237 656/4ST NTIS Prices: PC\$4.25/MF\$2.25

Design, Development and Qualification Testing of the U.S. Navy NES-21A Parachute Assembly

Naval Aerospace Recovery Facility El Centro Calif*Naval Air Systems Command, Washington, D.C. (245670)

Final rept.

AUTHOR: Matsuo, Jon T.

C3953H1 PLD: 6G, 1C, 5E, 51C, 95D USGRDR7503

Jul 74 46p

REPT NO: NAVAERORECOVPAC-TR-1-74

MONITOR: 18

ABSTRACT: The report covers the design, development, and the U.S. Navy Service Qualification Program conducted on the NES-21A personnel parachute assembly designed for use in ejection seats of U.S. Navy T-33B and QT-33A aircraft. The NES-21A design objective was to provide a retrofitable replacement for the existing NS-3 personnel parachute assembly which would operate with a decreased opening time. This factor would improve aircrew survivability in the low speed, zero altitude operational envelope. This improvement was accomplished principally by the incorporation of a 40-inch diameter internal pilot chute and main canopy PDVL (Pull Down Vent Lines). The NES-21A parachute assembly will perform satisfactorily as presently designed at 90 KTAS (Knots True Airspeed) and above, for ground level and higher altitude ejections.

DESCRIPTORS: *Parachutes, *Ejection seats, *Naval aircraft, Jet training planes, Flight testing, Anthropometry, Parachute descents, Parachute canopies, Survival

IDENTIFIERS: NES-21A parachutes, T-33 aircraft, QT-33A aircraft, T-33B aircraft, Operational envelope, NTISDODN

AD/A-001 754/1ST NTIS Prices: PC\$3.75/MF\$2.25

MVMA Two-Dimensional Crash Victim Simulation, Version 3, Volume III

Michigan Univ., Ann Arbor. Highway Safety Research Inst.*Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Mich. (407 825)

Final rept.

AUTHOR: Bowman, B. M., Bennett, R. O., Robbins, D. H.

C3871K4 PLD: 13L, 13F, 95D, 85D, 96D USGRDR7501

28 Jun 74 224p

REPT NO: UM-HSRI-BI-74-1-3

MONITOR: 18

Prepared in cooperation with Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Mich. See also Volume 2, PB-236 907.

ABSTRACT: Volume Three is intended primarily for the professional computer programmer who is responsible for program maintenance and improvements in the Two-Dimensional Crash Victim Simulator. The volume describes the organization of the computer program into three processors and their interactions. Description of program organization and flow, packing techniques, binary output formats, and auxiliary program output is presented for each of the three processors. Design information concerning certain special output subprocessors is provided. Conversion of the computer program for use on various computer systems is discussed.

DESCRIPTORS: *Motor vehicle accidents, *Anthropometry, Mathematical models, Motion, Joints (Anatomy), Loads (Forces), Safety devices, Data processing, Computerized simulation, Central processing units, Computer systems programs

IDENTIFIERS: Air bag restraint systems, NTISHSRI

PB-236 908/OST NTIS Prices: PC\$7.25/MF\$2.25

MVMA Two-Dimensional Crash Victim Simulation, Version 3. Volume II

Michigan Univ., Ann Arbor. Highway Safety Research Inst.*Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Mich. (407 825)

Final rept.

AUTHOR: Bowman, B. M., Bennett, R. O., Robbins, D. H.

C3871K3 FLD: 13L, 13F, 95D, 85D, 96D USGRDR7501

28 Jun 74 296p

REPT NO: UM-HSRI-BI-74-1-2

MONITOR: 18

Prepared in cooperation with Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Mich. See also Volume I, PB-235 753, and Volume 3, PB-236 908.

ABSTRACT: Volume Two is intended primarily as a guide to the day to day usage of the Two-Dimensional Crash Victim Simulator. The volume contains specifications for the input data cards together with a detailed description of input data quantities. Normal output options and certain normal output quantities are described. Input and output is presented for two sample exercises of the computer model.

DESCRIPTORS: *Motor vehicle accidents, *Anthropometry, Mathematical models, Motion, Joints (Anatomy), Loads (Forces), Safety devices, Data processing, Computerized simulation

IDENTIFIERS: Air bag restraint systems, NTISHSRI

PB-236 907/2ST NTIS Prices: PC\$8.75/MF\$2.25

Development of a National Anthropometric Data Base: A Preliminary Study Report

National Bureau of Standards, Washington, D.C. Technical Analysis Div.
(406 647)

Final rept.

AUTHOR: Steinberg, Harold L.

C3781J4 PLD: 6N, 5E, 5B, 95D, 88B, 57, 86V USGRDR7426

Jun 74 87p

REPT NO: NBSIR-74-506

MONITOR: 18

ABSTRACT: A study was made to determine the need for development of a Nationally Representative Anthropometric data base. Potential users and their needs are identified and the inability of existing anthropometric data to satisfactorily meet these needs is established. Three scenarios for developing a useful data base are considered. Two involve the use of biostereometrics while the third takes a relatively conventional approach to obtaining body dimensions. Conclusions relevant to each of these scenarios, as well as the potential advantages/disadvantages of each, are developed. Salient conclusions common to all three scenarios include: The need for a pilot study; the desirability of linking the actual anthropometric survey to a National Center for Health Statistics (NCHS) 'Health and Nutrition Examination Survey' (HANES); and a data base development time of at least 7 years. Program costs, detailed in an appendix, range from \$2.4M to \$5.2M.

DESCRIPTORS: *Anthropometry, *Information systems, Information retrieval, Human factors engineering, Medical research, Surveys, Tables(Data)

IDENTIFIERS: User surveys, *National data systems, Scenarios, NTISCOMNBS

COM-74-11632/8SL NTIS Prices: PC\$4.75/MF\$2.25

Development of Headforms for Sizing Infantry Helmets

Army Natick Labs Mass Clothing Equipment and Materials Engineering Lab
(408902)

Technical rept.

AUTHOR: Claus, William D. Jr, McManus, Lawrence R., Durand, Philip E.
C3753C4 PLD: 6Q, 15E, 74E USGRDR7426

Jun 74 34p

REPT NO: CE/MEL-131

PROJECT: DA-1-T-662713-DJ-40

MONITOR: USA-NLABS-TR-75-23-CEMEL

ABSTRACT: A new technique for defining and measuring head shapes was developed and applied in the fabrication of a set of first generation plaster headforms. The design of a unique head measuring device is reported. The device is a clear polycarbonate hemisphere on which are mounted twenty-seven moveable mechanical probes. The hemisphere is placed over a subject's head, and the probes are moved to contact the head and thus define head shape. The probe data from a population of Army men were reduced statistically to yield generalized head shapes. The feasibility of combining this probe technique with classical anthropometric head measurements to yield generalized head shapes of various sizes was demonstrated. A set of first generation headforms was sculptured using specified probe data. (Author)

DESCRIPTORS: *Helmets, *Anthropometry, Infantry, Head (Anatomy), Measurement, Shape, Models, Manufacturing

IDENTIFIERS: Size determination, NTISDODA

AD-787 277/3SL NTIS Prices: PC\$3.75/MF\$2.25

MVMA Two-Dimensional Crash Victim Simulation, Version 3. Volume I

Michigan Univ., Ann Arbor. Highway Safety Research Inst.*Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Mich. (407 825)

Final rept.

AUTHOR: Bowman, B. M., Bennett, R. O., Robbins, D. H.

C3581A4 FLD: 13L, 13P, 95D, 85D, 96D USGRDR7423

28 Jun 74 212p

REPT NO: UM-HSRI-BI-74-1-1

MONITOR: 18

Prepared in cooperation with Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Mich.

ABSTRACT: The volume contains the detailed formulation of the equations of planar motion of a vehicle occupant in a crash environment. The features of the analytical model include: (1) an eight mass, fourteen degree of freedom representation of the human body; (2) an extensible multi-joint neck and a flexible shoulder joint; (3) simulation of muscle contraction as a time-dependent phenomenon; (4) the modeling of contact between the victim and the vehicle; (5) specification of material properties of vehicle and occupant in terms of general force-deformation relationships; (6) structural collapse resulting either from collision forces or occupant contact forces; (7) an airbag model; (8) an energy absorbing steering assembly; (9) an energy absorbing belt restraint submodel; (10) tabular three degree of freedom vehicle accelerations

DESCRIPTORS: *Motor vehicle accidents, *Anthropometry, Motion, Mathematical models, Equations of motion, Joints (Anatomy), Contacting, Deformation, Detectors, Loads (Forces), Safety devices, Steering, Safety engineering

IDENTIFIERS: Air bag restraint systems, NTISHSRI

PB-235 753/1 NTIS Prices: PC\$5.75/MF\$2.25

Advanced Air Bag Restraints for Standard Size Car Drivers. Volume II.
Final Program Report

Minicars, Inc., Goleta, Calif.*National Highway Traffic Safety
Administration, Washington, D.C.

Rept. for 1 Jul 72-28 Feb 74

AUTHOR: Friedman, Donald, Friedman, Keith

C3575H2 FLD: 13F, 13L, 85D, 95D, 96D USGRDR7423

Jul 74 367p

CONTRACT: DOT-HS-113-2-441

MONITOR: DOT-HS-801-173

See also Volume 1, PB-233 812.

ABSTRACT: The report summarizes the effort to develop an advanced air bag restraint system for standard size cars capable of protecting the driver in frontal and/or frontal oblique crashes. The result of the work has been the development of a system consisting of (a) a small quickly inflating double air bag, (b) and energy absorbing steering column mechanically stroking through rollerless tapes, (c) a mechanically stroking padded knee restraint linked to the steering column, (d) an energy absorbing seat assembly, and (e) compartment padding. The system is capable of protecting drivers throughout the adult anthropometric range at velocities to 50 mph as tested in sled simulated frontal, pitching, and angular impacts representing actual collisions.

DESCRIPTORS: *Automobiles, *Safety devices, *Crash tests,
*Anthropometry, Inflatable structures, Energy absorption, Steering,
Padding, Absorbers(Materials), Safety engineering, Impact tests,
Rocket propelled sleds, Collision research

IDENTIFIERS: *Air-bag restraint systems, Air bags, NTISDOTSA

PB-235 704/4 NTIS Prices: PC\$8.00/MF\$2.25

Physical Measurements, Cycle I: Health Examination Survey, 1959-1962.
User's Guide

National Center for Health Statistics, Rockville, Md. Div. of Health Examination Statistics.

AUTHOR: Schnack, George A.

C3503A4 FLD: 5E USGRDR7422

1962 47p

MONITOR: NCHS/DP-74/003a

For data file on magnetic tape, see PB-235 185.

ABSTRACT: The manual contains a description of the data file on magnetic tape containing data from a variety of physical measurements performed in the health examination survey of adults conducted during 1959-1962. The 17 body measurements are relevant to human engineering and include standing height, weight, sitting height, knee height, chest girth and other conventional body measurements.

DESCRIPTORS: *Anthropometry, *Demographic surveys, Body weight, Height, Human factors engineering, United States, Statistical data

IDENTIFIERS: *Health surveys, NTISHRACHS

PB-235 186/4 NTIS Prices: PC\$3.25/MF\$2.25

Physical Measurements, Cycle I: Health Examination Survey, 1959-1962

National Center for Health Statistics, Rockville, Md. Div. of Health Examination Statistics.

Data file

AUTHOR: Schnack, George A.

C3503A3 FLD: 5E, 62 USGRDR7422

1962 1 reel mag tap

MONITOR: NCHS/DP-74/003

Supersedes NCHS/DP-73/013.

Specify tape recording mode desired: 7 track, 556 or 800 or 1600bpi, Bcd, odd or even parity; or 9 track 800bpi, Ebcdic, odd parity.

ABSTRACT: The file contains data from a variety of physical measurements performed in the Health Examination Survey of adults conducted during 1959-1962. The 17 body measurements are relevant to human engineering and include standing height, weight, sitting height, knee height, chest girth and other conventional body measurements. The 1959-1962 Health Examination Survey is described under the listing for data tape NCHS/DP-74-001, the master file of demographic and socioeconomic information needed for use with other Cycle I data tapes.

DESCRIPTORS: *Data file, *Anthropometry, *Demographic surveys, *Health surveys, Body weight, Height, Magnetic tapes, Human factors engineering, United States, Statistical data

IDENTIFIERS: NTISHRACHS

PB-235 185/6 NTIS Prices: Mag Tape \$97.50; Foreign \$122.50

Experimental Determination of Mechanical Features of Adults and Children

Texas Inst. for Rehabilitation and Research, Houston. Biostereometrics Lab.*National Highway Traffic Safety Administration, Washington, D.C.

Final rept. May 72-Feb 74

AUTHOR: Herron, R. E., Cuzzi, J. R., Goulet, D. V., Hugg, J. E.

C3492C2 PLD: 13L, 6N, 95D, 85D USGRDR7422

Jun 74 175p

CONTRACT: DOT-HS-231-2-397

MONITOR: DOT-HS-801-168

ABSTRACT: An experimental investigation was carried out with a view towards developing improved methods for acquiring comprehensive body form and biomechanical data for use in mathematical modeling of traffic accidents. Twenty-one children ranging in weight from 32.25 to 54.0 pounds and five adults, three males and two females, served as subjects. Automatic data acquisition systems, based on the principles of biostereometrics, were used to obtain a wide range of body form and biomechanical data, including: Three-dimensional coordinates and cross sections for major body parts and the body as a whole; volume distribution curves for major body parts and the body as a whole; perimeter distribution curves, linear anthropometric dimensions, and estimates for surface area, volume, center of gravity and inertial tensors for major body parts and the body as a whole; and globographic data for all major joint sinuses, using a newly-designed, real-time stereometric joint motion sensor.

DESCRIPTORS: *Motor vehicle accidents, *Anthropometry, Children, Adults, Measurement, Motion, Joints (Anatomy)

IDENTIFIERS: NTISDOTSA

PB-234 079/2 NTIS Prices: PC\$5.00/MF\$2.25

High Acceleration Cockpits for Advanced Fighter Aircraft. Volume IV.
Test Results

McDonnell Douglas Corp St Louis Mo*Air Force Flight Dynamics Lab.,
Wright-Patterson AFB, Ohio. (404120)

Final technical rept. 1 Apr-14 Dec 73
AUTHOR: Asiala, Carl F., Quinn, Thomas J.
C3402F1 FLD: 1C, 5E, 51C, 95D USGRDR7421
May 74 94p
REPT NO: MDC-A2631-Vol-4
CONTRACT: F33615-73-C-3067
PROJECT: AF-6190
MONITOR: AFFDL-TR-74-48-Vol-4
See also Volume 3, AD-783 602.

ABSTRACT: A high acceleration cockpit design test/evaluation program was conducted, using a full scale design aid. Alternate configurations were compared using this full scale design aid in a formally structured evaluation including mission related task elements. Test criteria considered evaluation of control/display and cockpit design options, including seat location, motion, and pilot anthropometry, with a balance between the physical and operational test measures and objectives using Air Force provided pilot subjects. (Author)

DESCRIPTORS: *Jet fighters, *Cockpits, *Human factors engineering, Configurations, Acceleration, Maneuverability, Ejection seats, Anthropometry, Mission profiles, Aeronautics, Display systems, Electrooptics

IDENTIFIERS: Articulating seats, High G cockpits, F-4 aircraft, Design, NTISDODAF

AD-783 603/4 NTIS Prices: PC\$4.00/MF\$2.25

High Acceleration Cockpits for Advanced Fighter Aircraft. Volume III.
Test Plan

McDonnell Douglas Corp St Louis Mo*Air Force Flight Dynamics Lab.,
Wright-Patterson AFB, Ohio. (404120)

Final technical rept. 1 Apr-14 Dec 73

AUTHOR: Asiala, Carl F., Quinn, Thomas J.

C3402E4 FLD: 1C, 5E, 551C, 95D USGRDR7421

May 74 66p

REPT NO: MDC-A2631-Vol-3

CONTRACT: F33615-73-C-3067

PROJECT: AF-6190

MONITOR: AFFDL-TR-74-48-Vol-3

See also Volume 2, AD-783 601, and Volume 4, AD-783 603.

ABSTRACT: A high acceleration cockpit design and integration program was conducted, using a full scale design aid. Alternate configurations were compared using this full scale design aid in a formally structured evaluation including mission related task elements. Crew station characteristics were thus related to operator needs in a mission context for advanced fighter concepts. (Author)

DESCRIPTORS: *Jet fighters, *Cockpits, *Human factors engineering, Configurations, Static tests, Ejection seats, Anthropometry, Mission profiles, Aeronautics, Display systems, Electrooptics

IDENTIFIERS: Articulating seats, High G cockpits, F-4 aircraft, Design, NTISDODAF

AD-783 602/6 NTIS PRICES: PC\$3.75/MF\$2.25

Performance Evaluation of the Highway Safety Research Institute (HSRI)
Anthropomorphic Test Dummy

Calspan Corp., Buffalo, N.Y. (407 727)

Interim technical rept. Jun 73-Jan 74

AUTHOR: Naab, Kenneth N., Massing, Daniel E.

C3292D3 FLD: 13L, 13F, 85D, 95D, 96D USGRDR7419

Jun 74 376p

REPT NO: CALSPAN-ZS-5352-V-1

CONTRACT: DOT-HS-053-3-664

MONITOR: DOT-HS-801-154

ABSTRACT: The objective of the program has been to experimentally evaluate the performance of a 50th percentile anthropomorphic test dummy developed by the Highway Safety Research Institute (HSRI). Two identical dummies were furnished for measurement and verification of the degree of conformance to specified criteria, and for establishment, by appropriate testing, of the ranges of performance and repeatability of test devices under conditions of crash environments. A series of eleven static and dynamic component tests were performed; fourteen type-2 belt restraint tests and six air bag restraint tests were performed using an accelerator sled to simulate a 30 MPH impact crash. The results indicate that the HSRI dummy responses differ substantially from those of the GM Hybrid II dummy evaluated.

DESCRIPTORS: *Motor vehicle accidents, *Collision research, *Anthropometry, *Anatomical models, Measurement, Evaluation, Crash tests, Impact tests, Safety belts, Safety devices, Design criteria

IDENTIFIERS: NTISDOTHSA

PB-234 310/1 NTIS Prices: PC\$8.25/MF\$1.45

Advanced Air Bag Restraints for Standard Size Car Drivers. Volume I.
Executive Summary

Minicars, Inc., Goleta, Calif.

Final rept. 1 Jul 72-28 Feb 74

AUTHOR: Friedman, Donald, Friedman, Keith

C3221C4 FLD: 13P, 13L, 85D, 95D, 96D USGRDR7418

Jul 74 31p

CONTRACT: DOT-HS-113-2-441

MONITOR: DOT-HS-801-162

ABSTRACT: The report summarizes the effort to develop an advanced air bag restraint system for standard size cars capable of protecting the driver in frontal and/or frontal oblique crashes. The result of the work has been the development of a system consisting of (a) a small quickly inflating double air bag, (b) an energy absorbing steering column mechanically stroking through rollerless tapes, (c) a mechanically stroking padded knee restraint linked to the steering column, (d) an energy absorbing seat assembly, and (e) compartment padding. The system is capable of protecting drivers throughout the adult anthropometric range at velocities to 50 mph as tested in sled simulated frontal, pitching, and angular impacts representing actual collisions. The design minimizes structural modifications necessary to achieve the desired impact performance.

DESCRIPTORS: *Automobiles, *Safety devices, *Crash tests, *Anthropometry, Inflatable structures, Energy absorption, Steering, Padding, Absorbers (Materials), Safety engineering, Impact tests, Rocket propelled sleds, Collision research

IDENTIFIERS: NTISDOT, *Air bag restraint systems, Air bags, NTISNHTSA

PB-233 812/7 NTIS Prices: PC\$3.25/MF\$1.45

Evaluation of the Microcapsule Pressure Measurement Pads

National Highway Traffic Safety Administration, Washington, D.C.
Office of Crashworthiness.

Technical rept.

AUTHOR: Radovich, Vladislav G.

C3221C3 FLD: 14B, 13F, 13L, 85D, 95D, 96D USGRDR7418

May 74 13p

REPT NO: DOT-HS-801 172

MONITOR: 18

ABSTRACT: Dye-filled microcapsule pads for measurement of contact surface pressures, were evaluated in simulated automobile crash tests on test dummies restrained by seat belts. The microcapsule pads were exposed to belt loads on the dummy's chest and abdomen and to head impacts against the head rest. In a limited amount of testing good agreement was found between the pressures measured with microcapsule pads and corresponding values computed from belt tension and head acceleration measurements.

DESCRIPTORS: *Automobiles, *Crash tests, *Pressure measurement, *Safety belts, Anthropometry, Indicating instruments, Evaluation, Impact tests, Loads(Forces), Anatomical models, Acceleration, Collision research, Safety engineering

IDENTIFIERS: NTISNHTSA

PB-233 810/1 NTIS Prices: PC\$3.00/MF\$1.45

Comparative Human Factors Analysis of the U. S. Navy Mark V. and Mark XII Dive Systems

Naval Medical Research Inst Bethesda Md (249650)

Medical research progress rept. No. 7

AUTHOR: Armstrong, F. W., Bachrach, A. J., Conda, K. J., Holiman, M. J., Egstrom, G. H.

C3184F2 PLD: 6K, 15E USGRDR7418

1 Jun 74 89p

PROJECT: M4306.03

MONITOR: 18

ABSTRACT: A series of tests were conducted to assess the suitability of the U.S. Navy prototype Mark XII hardhat diving system as a replacement for the U.S. Navy standard Mark V diving system. The tests combined operational testing with human factors testing to depths of 300 ft under four separate environmental conditions: open tank, hyperbaric chamber, Anacostia River, and open water. Air was used as the breathing medium for shallow depths, with HeO2 substituted as depths increased. Task times were recorded and compared, as well as dressing and undressing times. An equipment evaluation was made by each diver on the Mark XII. An anthropometric study of both systems was performed, measuring range of movements on 14 anthropometric measures. (Modified author abstract)

DESCRIPTORS: *Diver equipment, *Breathing apparatus, *Protective clothing, *Human factors engineering, Performance(Human), Anthropometry, Tests, Depth, Divers

IDENTIFIERS: Mark 5 diving systems, Mark 12 diving systems, NTISDODN

AD-781 641/6 NTIS Prices: PC\$4.00/MF\$1.45

Breaking Strength of the Human Skull vs Impact Surface Curvature

Wayne State Univ., Detroit, Mich. Dept. of Neurosurgery.

Final rept. 20 Dec 71-31 Mar 73

AUTHOR: Voigt, R., Thomas, L. Murray

C3141G1 FLD: 6E, 13L, 570, 85D USGRDR7417

Nov 73 189p

CONTRACT: DOT-HS-146-2-230

MONITOR: DOT-HS-801-002

See also PB-204 239.

ABSTRACT: An investigation has been conducted into the effects of surface shape, hardness and impact location on the heads of human cadavers. This is the second year of a study involving eighty cadavers and most of the important results and conclusions are listed and discussed in this report. Impact surfaces included flat rigid and resilient, rigid cylindrical $1/8$ in. radius up to 1 in. radius, resilient cylindrical 1 in. radius and rigid hemispherical shapes ranging from 3 in. to 8 in. radius. Impact locations include front, side and rear. The various impact conditions are related to type of skull fracture produced and several head injury parameters such as, velocity, peak force, acceleration, contact pressure and magnitude, and head injury criterion (HIC).

DESCRIPTORS: *Skull, *Fracture strength, *Impact strength, Head(Anatomy), Injuries, Acceleration tolerance, Breaking load, Motor vehicle accidents, Anatomy, Anthropometry, Tables(Data), Computer programs

IDENTIFIERS: NTISNHTSA

PB-233 041/3 NTIS Prices: PC\$5.50/MF\$1.45

The Effects of Initial Spinal Configuration on Pilot Ejection

Army Aeromedical Research Lab Fort Rucker Ala (404578)

AUTHOR: Liu, Y. King, Pontius, Uwe R., Hosey, Ronald R.

C3112H4 FLD: 6S, 57W, 57A USGRDR7417

Oct 73 56p

REPT NO: USAARL-74-6

PROJECT: DA-3-A-062110-A-819

MONITOR: 18

ABSTRACT: The effect of initial spinal alignment on the location and magnitude of maximum vertebral stress during ejection was studied using the Orne-Liu discrete parameter model of the spine. Face curtain, shoulder harness, and seat back restraints were added to the model as linear springs. Spinal alignment data used were from x-rays of a 5th, 40th, and 95th percentile (sitting height) man seated in the MK-J5(D) ejection seat under static conditions. Maximum normal stresses were shown to occur at L1(5th), T12(40th) and T9(95th) with face curtain and shoulder harness restraint. Results indicated that a state of nearly uniform axial stress exists in the column during ejection and thus the location of maximum bending stress dictates the spinal location of the maximum normal stress. Hence, initial spinal alignment, in terms of the curvature of the column, is a major determinant of the location and magnitude of maximum normal stress for a given set of restraints. (Modified author abstract)

DESCRIPTORS: *Spinal column, *Ejection seats, Impact, Wounds and injuries, Static conditions, Biomechanics, Stress(Physiology), Pilots, Aerospace medicine, Anthropometry

IDENTIFIERS: Recommendations, NTISDODA

AD-780 847/0 NTIS Prices: PC\$5.75/MF\$1.45

Evaluation of the Anthropometric Compliance Tool

Essex Corp., Alexandria, Va. (391 122)

Final rept. Jun-Dec 73.

C3023L2 FLD: 14B, 13F, 13L, 94F, 85D, 95D, 96D USGRDR7415

May 74 101p

CONTRACT: DOT-HS-120-3-773

MONITOR: DOT-HS-801-124

ABSTRACT: The objectives of the investigation were to: (1) Establish the utility of the anthropometric compliance tool as a field test instrument; (2) determine the reliability of tool measurements; and (3) formulate recommendations for tool redesign or tool procedure modification. The tool evaluation was conducted by means of an empirical investigation of its accuracy, reliability, and usability in five types of vehicles. Subjects were selected for this investigation to be representative of the general population of compliance test personnel. The tool was evaluated in terms of its capability to measure to two foot controls and three hand controls. Measures of performance included time to assemble, install, and use the tool, procedural errors, and tool accuracy and reliability in measuring distances to controls with respect to the seating reference point.

DESCRIPTORS: *Tools, *Test equipment, *Automobiles, *Anthropometry, Reliability, Accuracy, Safety devices, Design standards, Measurement

IDENTIFIERS: Compliance tests, NTISNHTSA

PB-232 540/5 NTIS Prices: PC\$4.50/MP\$1.45

Crew System Design

Anacapa Sciences Inc Santa Barbara Calif (405951)

AUTHOR: Cross, Kenneth D., McGrath, James J.

C2845J2 FLD: 5E, 1C, 51C, 84C USGRDR7413

Jul 73 373p

CONTRACT: N00014-72-C-0105

MONITOR: 18

Proceedings of an Inter-agency Conference Held at Los Angeles, Calif., on September 12-14, 1972.

ABSTRACT: The purpose of the conference was to promote the timely use of the best available technology in the development and evaluation of aerospace crew systems.

DESCRIPTORS: *Meetings, *Aerospace systems, *Flight crews, Manpower utilization, Personnel selection, Performance (Human), Requirements, Measurement, Data management, Cost effectiveness, Computer applications, Human factors engineering, Stations, Anthropometry, Kinematics, Life support, Airborne

IDENTIFIERS: N

AD-777 996/0 NTIS Prices: PC\$21.75/MF\$1.45

Shuttle Passenger Couch

Martin Marietta Corp., Denver, Colo.

Final Report.

AUTHOR: Rosener, A. A., Stephenson, M. L.

C2831C2 FLD: 5E, 95D STAR1209

Jan 74 120

REPT NO: NASA-CR-134200, MCR-74-40

CONTRACT: NAS9-13010

MONITOR: 18

ABSTRACT: Conceptual design and fabrication of a full scale shuttle passenger couch engineering model are reported. The model was utilized to verify anthropometric dimensions, reach dimensions, ingress/egress, couch operation, storage space, restraint locations, and crew acceptability. These data were then incorporated in the design of the passenger couch verification model that underwent performance tests.

DESCRIPTORS: *Anthropometry, *Couches, *Passengers, *Space shuttles, *Structural design criteria, Human factors engineering, Performance tests, Scale models, Space transportation

IDENTIFIERS: NASA

N74-17854/2 NTIS Prices: PC\$9.00/MF\$1.45

Industrial Ergonomics Abstracts. Volume 5, Number 2

British Steel Corp., Sheffield (England). Information Services.

C2464J1 FLD: 5E, 95D, 94D USGRDR7408

Sep 73 16p

REPT NO: CEL/HF/46/73

MONITOR: 18

See also Volume 4, No. 4, PB-222 676.

ABSTRACT: Abstracts are given of reports on biotechnology. This volume deals with the following areas: The psychology, physiology, anthropometry and biomechanics of man as a systems component; data presentation, input facilities, workplace and equipment design, and environmental design of the design of the man-machine interface; noise; thermal conditions; systems design and organization; and methods, techniques and equipment in ergonomics.

DESCRIPTORS: *Human factors engineering, *Man machine systems, Industrial psychology, Physiology, Anthropometry, Environmental engineering, Temperature, Noise, Motivation, Attitudes, Systems engineering, Abstracts, Great Britain

IDENTIFIERS: *Ergonomics, GBISRA

PB-227 461/1 NTIS Prices: PC\$4.00/MP\$1.45

Arm Reach Boundaries for Cockpit Control Operation

Department of Civil Aviation, Melbourne (Australia).

AUTHOR: Bullock, M. I., Steinberg, M. A.

C2325B1 PLD: 5E, 95D STAR1203

Jun 73 98p

REPT NO: MEMO-31

MONITOR: 18

ABSTRACT: Because of the fact that light aircraft cockpits were designed when pilots were restrained by a lap belt only, the recent use of firm upper torso restraint has introduced a problem of control accessibility. Therefore, a determination of the functional arm reach boundaries for the Australian male and female pilot populations has been made and certain structural anthropometric measurements have been recorded. The apparatus used, the experimental procedure and the various percentiles of thumb tip arm reach are described in this report. These data should provide information for the design or modification of restraint systems and of cockpits which will allow manipulation of manual controls by all pilots while effectively restrained. (Author)

DESCRIPTORS: *Aircraft pilots, *Arm (Anatomy), *Constraints, *Muscular function, Anthropometry, Australia, Cockpits, Human factors engineering, Manual control

IDENTIFIERS: NASA

N74-11902/5 NTIS Prices: PC\$7.00/MF\$1.45

Cockpit Geometry Evaluation, Phase III Final Report. Volume III.
Computer Program System

Boeing Aerospace Co Seattle Wash (059610)

Rept. for 1 Dec 70-30 Nov 71

AUTHOR: Katz, Robert

C2261G2 FLD: 1C, 5E, 51C USGRDR7406

30 Jun 72 1064p

REPT NO: D162-10127-3

CONTRACT: N00014-71-C-0170

PROJECT: NR-213-065

MONITOR: JANAIR-720402

See also Volume 1, AD-772 486.

ABSTRACT: The Cockpit Geometry Evaluation (CGE) Program is a development of improved methods for evaluating the physical compatibility of crew members with crew stations. The heart of the program is a 23-joint, three-dimensional man-model (BOEMAN) that simulates the motion of humans performing tasks in a given environment. The computer program system (CPS) ties the project together. The system uses an updatable bank of anthropological, environmental and task sequence data. This volume contains both the historical development of CGECPS as well as the most recent capabilities and modifications to the Computer Program System. (Modified author abstract)

DESCRIPTORS: *Cockpits, *Human factors engineering, Geometry, Anthropometry, Mathematical models, Performance(Human), Standards, Military requirements, Computer programs

IDENTIFIERS: N

AD-772 488/3 NTIS Prices: PC\$55.00/MF\$1.45

Cockpit Geometry Evaluation, Phase III Final Report. Volume I. Program Description and Summary

Boeing Aerospace Co Seattle Wash (059610)

Rept. for 1 Dec 70-30 Nov 71

AUTHOR: Ryan, Patrick W.

C2261F4 FLD: 1C, 5E, 51C USGRDR7406

Sep 72 189p

REPT NO: D162-10125-3

CONTRACT: N00014-71-C-0170

PROJECT: NR-213-065

MONITOR: JANAIR-720401

See also Volume 3, AD-772 488.

ABSTRACT: The Cockpit Geometry Evaluation Program is an experimental development to establish a standardized method for evaluating the physical compatibility of a seated crew member of any size with the geometry of a crew station, beginning with the design concept. Data on the geometry of the crew station, the anthropometric characteristics of the crew members, and the sequence of tasks to be performed are stored in a computer. Mathematical routines provide dynamic movement for a variable-sized mathematical man-model. Numerical performance indicators, identification of physical and visual interferences, and reach infeasibilities are output. The crew station compliance with certain MIL-STD and -SPEC requirements is also checked. (Modified author abstract)

DESCRIPTORS: *Cockpits, *Human factors engineering, Geometry, Anthropometry, Mathematical models, Performance (Human), Interference

IDENTIFIERS: N

AD-772 486/7 NTIS Prices: PC\$5.50/MF\$1.45

Pilot Armreach and Cockpit Control Locator Machine

Department of the Interior Washington D C (109950)

Patent

AUTHOR: Alexander, Milton, Garrett, John W., Riepenhoff, Ralph R.

C2254J3 FLD: 14B, 1C, 5E, 95D, 90 USGRDR7406

Filed 7 Jul 71, patented 26 Sep 72 8p

REPT NO: PAT-APPL-161 361, PATENT-3 693 265

MONITOR: 18

Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 \$0.50.

ABSTRACT: The invention relates to an improved method and test apparatus for measuring the ability of a pilot, while strapped in an aircraft cockpit seat, to reach, grasp and satisfactorily operate various control knobs located on the instrument panel and at different positions within the cockpit.

DESCRIPTORS: *Patents, *Test equipment, *Pilots, *Human factors engineering, Cockpits, Measurement, Instrument panels, Control knobs, Anthropometry, User needs, Acceptability, Engineering, Standards

IDENTIFIERS: PAT-CL-35-12-F, GPAF

AD-164 340/2 NTIS Price: Not available NTIS

Atlas of Muscular Strength within the Hand and Foot Reach of Seated Operator

Paris Univ (France) Dept of Applied Anthropology (408340)

AUTHOR: Coblentz, Alex, Ignazi, G.

C2011G4 FLD: 5E USGRDR7402

26 Oct 73 5p

GRANT: AF-AFOSR-2411-72

PROJECT: AF-9767

TASK: 976701

MONITOR: EOARD-TR-73-28

ABSTRACT: The report discusses the following: Plans to measure static and dynamic forces and optimum action capabilities of seated operators; techniques of measuring body segmental mass, segmental inertia, and centers of gravity; and facilities available for biomechanical and anthropometrical studies at their laboratory at the University of Paris. (Modified author abstract)

DESCRIPTORS: (*Hands, Strength(Physiology)), (*Feet, Strength(Physiology)), (*Operators(Personnel), Strength(Physiology)), Biomechanics, France, Anthropology, Anthropometry, Human factors engineering, Muscles

IDENTIFIERS: Atlases, AF

AD-770 059/4 NTIS Prices: PC\$3.00/MF\$1.45

Development of Standards for Industrial and Firefighters Head Protective Devices. Volume I. Criteria for Development of Standards for Industrial and Firefighters Head Protective Devices. Volume II. Recommended Standards for Industrial and Firefighters Head Protective Devices

Brown (Daton T.), Inc., Bohemia, N.Y. Testing Labs. Div.

Final rept.

AUTHOR: Scalone, Albert A.

C1993I3 FLD: 6Q, 91C* USGRDR7401

13 Aug 73 308p*

CONTRACT: HSM-99-72-86

MONITOR: NIOSH-TR-053-73

ABSTRACT: The report presents a series of standards for industrial and firefighters head protective devices. These constitute: (1) a performance standard which lists the attributes and levels of performance for four classes of industrial head protective devices, (2) a testing standard, which describes test methods, procedures, and equipment for each attribute to be tested, and (3) a user standard which describes how industrial and firefighters head protective devices are to be properly selected, used and maintained.

DESCRIPTORS: (*Headgear, Standards), (*Firefighting, Headgear), Industries, Personnel, Protection, Performance evaluation, Injuries, Human factors engineering, Anthropometry, Impact tests, Penetration, Flammability, Safety devices, Protective clothing

IDENTIFIERS: NIOSH

PB-225 163/5 NTIS Prices: PC\$7.00/MF\$1.45

Crash Test Device Development. Repeatable Pete

Michigan Univ., Ann Arbor. Highway Safety Research Inst. (407 825)

Final rept.

AUTHOR: McElhaney, James H.

C1993I2 FLD: 13F, 13L, 85D, 95D, 96D USGRDR7401

Jun 73 162p

REPT NO: UM-HSRI-BI-73-3-1

MONITOR: 18

ABSTRACT: The report describes the development and performance of a new crash test device aptly named, Repeatable Pete. The general goal of the project was the development of an adequate crash test device to aid in the evaluation of the injury reducing potential of automotive passenger restraint systems. The general design Criteria were: Repeatability of test results; Reproducibility of test results; Human-like responses in a moderate automotive crash environment; Non-frangibility. Biomechanical data describing the dynamic impact responses of unembalmed cadavers was used as the basis for humanlike performance. New and uniquely repeatable joints were developed. A urethane head and chest with more humanlike dynamic response was also developed. Self-skinning urethane foam was used extensively. Great care was used throughout to insure proper isolation of metal components. Extensive sled testing of two devices was done to verify performance.

DESCRIPTORS: (*Automobiles, Safety engineering), (*Anthropometry, *Test equipment), Design, Reliability, Evaluation, Safety belts, Dynamic tests, Cadavers, Anatomical models, Joints (Anatomy)

IDENTIFIERS: HSRI

PB-225 162/7 NTIS Prices: PC\$10.25/MF\$1.45

Definition of Study Objectives for Integrated Crew Module Development

LTV Aerospace Corp Dallas Tex Vought Systems Div (408116)

Final rept. 1 Jul 72-31 Aug 73

AUTHOR: Atkins, E. R., Hodges, J. C., Harper, T. L., Hanking, J. R., Hall, A. A.

C1865D4 FLD: 1B, 6G, 51G USGRDR7324

Aug 73 261p

REPT NO: 2-57110/3R-3104

CONTRACT: N00014-72-C-0443

PROJECT: NR-213-106

MONITOR: JANAIR-730705

ABSTRACT: The technical report presents the results of a study to identify and qualify objectives in development of the Integrated Crew Module Crew Station. Study efforts encompassed the man factor in addressing crew performance and the machine factor thru analysis of critical design factors such as anthropometry, geometry, controls and displays, vision, and arrangement. A baseline configuration was developed from these studies. A significant portion of the investigation was devoted to supination of the aircrewman for acceleration tolerance improvement. (Modified author abstract)

DESCRIPTORS: (*Jet fighters, *Escape systems(Aerospace)), (*Supersonic flight, Ejection), Flight crews, Protection, Survival, Performance tests, Positioning reactions, Human engineering, Acceleration tolerance, Anthropometry, Ejection seats

IDENTIFIERS: Supine positioning, *Integrated crew modules, Inflight escape devices, Protective devices, Escape capsules, N

AD-769 065/4 NTIS Prices: PC\$6.25/MF\$1.45

COMBIMAN-Computerized Biomechanical Man-Model. COMBIMAN-Biomechanisches Computer-Modell des Menschen

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Kroemer, K. H. E.

C1692H2 PLD: 5E, 13L USGRDR7322

1972 18p

REPT NO: AMRL-TR-72-16

PROJECT: AF-7184

TASK: 718408

MONITOR: 18

Summary in German.

Availability: Pub. in Proceedings of IFU Colloquium 'Space Technology - A Model for Safety Techniques and Accident Prevention', Cologne, Germany, Apr 72 p73-88.

ABSTRACT: A computerized body analog, representing anthropometry, biomechanics, and ergonomics, will be useful in evaluating existing systems and in the future will be essential from the earliest stages in the development of new systems. Such an analog of the human operator, within the geometry of the work station, is currently being developed. It is called COMBIMAN, an acronym for COMputerized Biomechanical MAN-model. COMBIMAN is an engineering tool for representing the geometry and physics of the man-cockpit system. This paper summarizes a literature review, presents a general discussion of computer models representing the geometry of the operator at his work station, develops a strategy of the mathematical and computerization concepts, and describes the development phases of COMBIMAN. (Modified author abstract)

DESCRIPTORS: (*Body, Models(Simulations)), (*Human engineering, Aircraft), Computers, Anthropometry, Ergometers, Mathematical models

IDENTIFIERS: *Biomechanics, AF

AD-767 206/6 NTIS Price: Reprint

Annotated Bibliography of Reports

Naval Aerospace Medical Research Lab Pensacola Fla (406061)

Supplement no. 5, 1 Jnl 72-30 Jun 73

AUTHOR: McAllister, Rita S.

C1602D1 FLD: 6S, 6E, 57W, 57E USGRDR7321

30 Jun 73 28p

MONITOR: 18

See also report dated 30 Jun 72, AD-764 065.

ABSTRACT: ;Contents: Mechanisms underlying the behavior of the organs of equilibrium which result in motion sickness, functional reflex disturbances, and other unwanted side effects in navy personnel; Hyperbaric-hypobaric interactions as they relate to compressed air diving and aviation; Predicting motivational change and aeronautical adaptability among Navy and Marine Corps aviation trainees; Predicting fleet effectiveness of Navy and Marine Corps pilots and flight officers; Analysis of operational functions and unique characteristics of the naval flight officer; Investigation of pilot background factors in aviation accidents; Performance in non-human primates as influenced by low-frequency electromagnetic fields; Cockpit assignability codes and techniques for the presentation of anthropometric data.

DESCRIPTORS: (*Aviation medicine, *Bibliographies), (*Space medicine, Bibliographies), Military medicine, Motion sickness, Vestibular apparatus, Barometric pressure, Altitude, Adaptation(Physiology), Performance(Human), Pilots, Naval personnel, Aviation accidents, Electromagnetic fields, Primates, Anthropometry

IDENTIFIERS: Hyperbaric medicine, Hypobaric medicine, N

AD-766 458/4 NTIS Prices: PC\$3.00/MF\$1.45

Mass, Volume, Center of Mass and Mass Moment of Inertia of Head and Head and Neck of the Human Body

Tulane Univ New Orleans La (354900)

Final rept.

AUTHOR: Walker, Leon B. Jr, Harris, Edward H., Pontius, Uwe R.

C1225F4 PLD: 5E, 57A, 95D USGRDR7316

15 Mar 73 35p

CONTRACT: N00014-69-A-0248-0001, N00203-71-M-1619

MONITOR: 18

ABSTRACT: The mass, volume, center of mass and mass moment of inertia of the head and neck and the head were determined for twenty human male cadavers. Anthropometric values and anatomic landmarks were obtained by external measurements and by use of x-ray procedures. The procedures used to determine the above measurements are described. Uniform planes for the separation of the head and neck from the torso and separation of the head from the neck were established and are described in detail. The values of the physical properties of the head and neck and the head are tabulated and compared to data reported in previous studies. (Author)

DESCRIPTORS: (*Head, *Anthropometry), Males, Humans, Physical properties, Anatomy, Human engineering, Inertia

IDENTIFIERS: Biodynamics, Biomechanics, Cadavers, N

AD-762 581 NTIS Prices: PC\$3.75/MF\$0.95

The Effect of Vehicle Structure Characteristics on Occupant Restraint Parameters. A Parametric Study

National Highway Traffic Safety Administration, Washington, D.C. (389 521)

Technical rept. Nov 72-Mar 73

AUTHOR: Krauss, Robert A., Strother, Charles E.

C1201K3 FLD: 13F, 13L, 85D*, 95D, 96D USGRDR7315

May 73 37p*

MONITOR: DOT-HS-820 260

ABSTRACT: A simple, one-dimensional model was constructed of the crash of a vehicle and restrained occupant for the purposes of better understanding the relationship between the response of the vehicle structure and the restraint system. The equations of motion of the model were derived and a computer program written to produce both printed and graphical solutions to these equations. The model and computer program are explained and the results discussed.

DESCRIPTORS: (*Motor vehicle accidents, Mathematical models), (*Safety belts, Anthropometry), (*Safety engineering, Automobiles), Crash tests, Computer systems programs, Equations of motion, Deceleration, Deformation, Automobile bodies

IDENTIFIERS: Occupant compartments, NHSB

PB-221 002/9 NTIS Prices: PC\$3.75/MF\$0.95

Source Data of Infant and Child Measurements Interim Data, 1972

Michigan Univ., Ann Arbor. School of Medicine. (228 850)
AUTHOR: Snyder, Richard G., Spencer, Martha, Owings, Clyde, Van Eck,
Peter
C1201A2 FLD: 5E, 95D, 96D USGRDR7315
Dec 72 305p
CONTRACT: FDA-72-70
MONITOR: 18

ABSTRACT: The report provides estimates for child measurement, such as those required for the design of objects used by children. The purpose of the study and report was to determine the basic infant and child measurements needed for direct and broad application to product safety design. . .designing equipment to obtain such measurements. . . and analysis of the findings.

DESCRIPTORS: (*Anthropometry, *Children), (*Human factors engineering, Children), Infants, Product development, Design, Safety engineering, Equipment

IDENTIFIERS: Product safety, FDABPS

PB-220 929/4 NTIS Prices: PC\$6.00/MF\$0.95

An Annotated Bibliography of United States Air Force Applied Physical Anthropology

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

Bibliography Jan 46-May 73

AUTHOR: Reid, Betty

C1171E4 FLD: 5E, 95D* USGRDR7315

May 73 66p*

REPT NO: AMRL-TR-73-51

PROJECT: AF-7184

TASK: 718408

MONITOR: 18

ABSTRACT: The report contains the titles, authors, publication/source information, and the abstracts of 132 technical reports and articles published by Anthropology Branch of the Aerospace Medical Research Laboratory between January 1946 and May 1973. It is a detailed document of the scope of the effort of the Air Force in the field of applied physical anthropology to provide the information on human body size and biomechanical characteristics of Air Force personnel required for the development and evaluation of Air Force systems, personal-protective equipment and clothing. Work in the following areas is described: Anthropometry; workspace; biomechanics; and sizing and designing of personal equipment. (Modified author abstract)

DESCRIPTORS: (*Anthropometry, *Human engineering), Anthropology, Air Force personnel, Military personnel, Logistics, Bibliographies

IDENTIFIERS: Biomechanics, Physical anthropology, AF

AD-762 287 NTIS Prices: PC\$4.50/MF\$0.95

Research and Demonstration Project for the Rehabilitation of the
Orthopaedically Handicapped

Madras Medical Coll. and Government General Hospital (India).
Artificial Limb Centre.

Final rept. 1 Apr 66-31 Mar 70
AUTHOR: Natarajan, M.
C1031J2 FLD: 6E USGRDR7313
1970 138p
PROJECT: SRS-IND-21-65
MONITOR: SRS-19-58121

ABSTRACT: A research and demonstration project (1966-1970) for the rehabilitation of orthopedically disabled persons in South India developed orthopedic appliances suitable for local manufacture and use. Standard dimensions and sizes of components for artificial limbs were determined by an anthropometric survey. Design of artificial limbs was modified to allow for walking barefoot and squatting to enable patients to return to normal daily activities in India. Dimensions and standardized sizes, in addition to evaluation of raw materials for fabrication of leg braces, were included. (Author)

DESCRIPTORS: (*Rehabilitation, *India), (*Orthopedics, *Projects), Artificial limbs, Counseling, Braces, Anthropometry, Congenital abnormalities

IDENTIFIERS: *Demonstration projects, *Disabled persons, SRS

PB-220 297/6 NTIS Prices: PC\$9.00/MF\$0.95

Anthropometry of the Latin-American Armed Forces

Army Tropic Test Center Apo New York 09827 (042290)

Final rept. Sep 65-Mar 71

AUTHOR: Dobbins, Delaney A., Kindick, Charles M.

C0981F4 FLD: 6N, 95D USGRDR7313

Aug 72 59p

REPT NO: USATTC-7209002

PROJECT: DA-1-T-061101-A-91-A, USATECOM-9-CO-049-000-001

MONITOR: 18

See also AD-654 762.

ABSTRACT: The United States Army Tropic Test Center made anthropometric measurements of a sample of Latin-American enlisted military personnel in the Canal Zone from September 1965 to February 1970. A total of 1985 trainees were measured--1852 airmen at the USAF Inter-American Air Forces Academy and 133 army personnel at the US Army School of the Americas. Fifteen Latin-American countries are represented in the sample. The average age for the sample was 23 years, average height was 5 feet, 5 1/2 inches, and average weight was 141 pounds. Percentiles and ranges for 75 physical measurements are presented, including isometric strength and hand-grip measures. Country-by-country comparisons are also presented. In addition, 1790 ABO blood group types are presented by country. (Author Modified Abstract)

DESCRIPTORS: (*Armed Forces (Foreign), *Latin America), (*Anthropometry, Armed Forces (Foreign)), Military personnel, Measurement, Hands, Strength, Blood groups

IDENTIFIERS: A

AD-759 949 NTIS Prices: PC\$3.00/MF\$0.95

Human Factor Evaluation of the USMC M1955 Armored Vest and the Proposed Titanium Nylon Improved Conventional Munitions Protective Armored Vest (48 Plate)

Human Engineering Lab Aberdeen Proving Ground Md (172850)

Technical memo.

AUTHOR: Scheetz, Hayden A., Corona, Bernard M., Ellis, Paul H., Jones, R. Douglas, Randall, R. Bradley

C0823F2 FLD: 19D, 5E, 79B, 95D USGRDR7312

Mar 73 77p

REPT NO: HEL-TM-8-73

MONITOR: 18

ABSTRACT: A human factors evaluation of the Army Simplified 48-Plate Titanium/Nylon Armored Vest and the M1955 USMC Doron Armored Vest was conducted by the U.S. Army Human Engineering Laboratory. The vests were compared as to physical characteristics, anthropometric measurements, vest movement and static exercise, employment of small arms by troops equipped with the vests, and user acceptance. The results yielded many points of contrast between vests, but no overriding superiority of either vest was noted. Recommendations are made to improve the qualities of the Simplified 48-Plate Titanium/Nylon configuration, based on the conclusion that a greater potential for further development is seen in the articulated configuration. (Author)

DESCRIPTORS: (*Body armor, *Human engineering), Titanium, Anthropometry, Nylon, Performance tests, Adaptation(Physiology), Firing tests(Ordnance), Performance(Human), Army equipment

IDENTIFIERS: M-1955 armored vests, A

AD-759 493 NTIS Prices: PC\$3.00/MF\$0.95

Human Engineering Guide to Equipment Design (Revised Edition)

American Institutes for Research Washington D C (023450)

AUTHOR: Van Cott, Harold P., Kinkade, Robert G.

C0691B4 FLD: 5E, 95D USGRDR7310

1972 757p

CONTRACT: N00014-70-C-0365

MONITOR: 18

Sponsored in part by Joint Army-Navy-Air Force Steering Committee.

Availability: Paper copy available from GPO \$8.00 as D410:EN3.

ABSTRACT: ;Contents: System and human engineering analyses; Man as a system component; Visual presentation of information; Auditory and other sensory forms of information presentation; Speech communication; Man-machine dynamics; Data entry devices and procedures; Design of controls; Design of individual workplaces; Design of multi-man-machine work areas; Engineering anthropology; Designing for maintainability; Training system design; Training device design; Human engineering tests and evaluation.

DESCRIPTORS: (*Human engineering, *Reviews), Systems engineering, Man-machine systems, Sensory perception, Display systems, Social communication, Control systems, Anthropometry, Maintainability, Training devices, Tests

IDENTIFIERS: Workplace layout, SD

AD-758 339 NTIS Prices: PC-GPO/MP\$0.95-NTIS

Current Status in Aerospace Medicine

Advisory Group for Aerospace Research and Development Paris (France)
(400043)

Conference proceedings no. 110

AUTHOR: Jones, Walton L.

C0691A1 FLD: 6E, 57E USGRDR7310

Feb 73 78

REPT NO: AGARD-CP-110

MONITOR: 18

Presented at the Aerospace Medical Panel Specialist Meeting, Glasgow, Scotland, 7-8 Sep 72. NATO furnished.

ABSTRACT: ;Contents: Recent NASA aerospace medicine technology developments; Non-fatal ejection vertebral fracture and its prevention; Management of asymptomatic carriers of hepatitis-associated-antigen; Syringomyelia and flying fitness; The biostack experiment on Apollo 16; Breeding monkeys for biomedical research; Hybrid computing - A technique for the immediate analysis of physiological data; Aeromedical evaluation of the phased-dilution concept for oxygen breathing systems; Specialized anthropometry requirements for protective-equipment evaluation; Human exposure criteria to laser energy; Study on some Air Force operational activities in Italy, with reference to thermal conditions and their effects on acceleration tolerance and psychomotor performance.

DESCRIPTORS: (*Space medicine, Symposia), (*Aviation medicine, Symposia), Air Force personnel, Fractures(Bone), Ejection, Hepatitis viruses, Nervous system diseases, Oxygen equipment, Anthropometry, Health physics, Lasers, Acceleration tolerance, Heat tolerance, Stress(Physiology)

IDENTIFIERS: Syringomyelia, Protective devices, SD

AD-758 332 NTIS Prices: PC\$3.00/MF\$0.95

A Projected Grid Method for Recording the Shape of the Human Face

Royal Aircraft Establishment, Farnborough (England).

AUTHOR: Cobb, J.

C0652K3 FLD: 5E STAR1107

Mar 72 33p

REPT NO: RAE-TR-71184, BR-28791

MONITOR: 18

ABSTRACT: The work carried out to design equipment is described which would quickly and cheaply record the shapes of a large number of human faces. It is intended for use in an anthropometric survey with a view to providing data for a project aimed at improving the fit and comfort of oxygen masks for service use. The data is examined to discover a parameter of the human face which can be used to determine which mask size is best suited to any individual. A simple, quick, and adequately accurate equipment for recording one side of the face was developed from an earlier design and includes several refinements to simplify the analysis. The survey will assume that the mean aircrew face is symmetrical although it is realized that individual faces are not. The accuracy of the equipment was measured and is within the required one millimeter. (Author)

DESCRIPTORS: *Anthropometry, *Contours, *Face (anatomy), *Oxygen masks, *Photographic recording, Color photography, Equipment specifications, Fitting, Flight crews, Grids, Lenses, Shapes

IDENTIFIERS: NASA

N73-16099 NTIS Prices: PC\$3.75/MF\$0.95

Industrial Ergonomics Abstracts, Volume 4, Number 2

British Steel Corp. (England). Human Factors Dept.

BISRA Open rept.

C0643J3 FLD: 5E, 13H, 94F USGRDR7309

Dec 72 10p

REPT NO: HF/31/72

MONITOR: 18

See also Volume 4, no. 1, PB-212 204.

ABSTRACT: ;Contents: Workplace and equipment design; Environmental design (illumination, noise, vibration, thermal conditions); The design of the man-machine interface - environmental design (specialized and protective clothing, specialised and protective equipment); Work organisation; Training; Methods, techniques and equipment in ergonomics-investigation of man as a systems component (psychology, physiology, anthropometry and biomechanics); Methods, techniques and equipment in ergonomics - investigation of systems design and organisation - work design and organisation.

DESCRIPTORS: (*Human factors engineering, *Abstracts), (*Industrial engineering, Human factors engineering), Industrial atmospheres, Environmental engineering, Workplace layout, Anthropometry, Man-machine systems, Design, Protective clothing, Safe handling, Noise(Sound), Vibration, Industrial training, Work measurement, Observation, Time studies, Mathematical models, Iron and steel industry, Great Britain

IDENTIFIERS: GBISRA

PB-216 186/7 NTIS Prices: PC\$3.00/MF\$0.95

Fat Boys Get Burned

Brooke Army Medical Center Fort Sam Houston Tex Army Inst of Surgical
Research (404885)

AUTHOR: Wilmore, Douglas W., Pruitt, Basil A. Jr

C0555A1 FLD: 6E, 57E USGRDR7308

1972 4p

MONITOR: 18

Availability: Pub. in The Lancet, p631-632, 23 Sep 72.

ABSTRACT: Several at-risk groups have been associated with a high incidence of thermal trauma; those susceptible to burns include alcoholics, epileptics, retarded children, and aged people who smoke. We have reviewed anthropomorphic characteristics of children seen at a burn centre to determine whether standard body measurements could identify an at-risk group predisposed to thermal trauma.

DESCRIPTORS: (*Burns, Children), Males, Body weight, Fire safety, Hazards, Anthropometry

AD-756 999 NTIS Price: Reprint

Anthropometry of Japde Personnel and Its Application for Human Engineering

Japanese Air Self-defense Force, Tokyo.

C0505A3 FLD: 5E, 95D STAR1105

1972 104p

MONITOR: 18

ABSTRACT: Tabulated anthropometric data of Japanese air defense personnel are presented and their applications for human factors engineering are described. The general areas of measurements include heights of parts of the body, arm and leg lengths, torso measurements, head data, palm and finger data, and foot and ankle data.

DESCRIPTORS: *Anthropometry, *Human factors engineering, *Japan, Armed forces (foreign), Tables (data)

N73-14091 NTIS Prices: PC\$7.25/MF\$0.95

Link System of the Human Torso

Michigan Univ Ann Arbor Highway Safety Research Inst (407825)

Final technical rept. Jun 70-Jul 71

AUTHOR: Snyder, Richard G., Chaffin, Don B., Schutz, Rodney K.

C0383K2 FLD: 5E, 95D, 85D USGRDR7306

Aug 72 286p*

REPT NO: HSRI-71-112

CONTRACT: F33615-70-C-1777

PROJECT: AF-7184

TASK: 718408

MONITOR: AMRL-TR-71-88

ABSTRACT: The objective of the study was to develop a quantitative description of the mobility of the human torso. This was accomplished by a systematic multi-disciplinary investigation involving techniques of cadaver dissection, anthropometry, radiography and cinefluoroscopy, photogrammetric, and computer analysis. Seventy-two anthropometric dimensions were obtained on 28 male volunteers, including bone lengths of the extremities and vertebral landmarks. These subjects were statistically matched for both stature and weight to a 1967 USAF anthropometric survey of 2385 adult males. Both radiographs and photographs from different viewing angles were then taken of the subjects while they performed specific reach motions. Statistical regressions were obtained which describe how specific surface markers and bone reference points move in relation to the elbow position for both seated and standing subjects. The major results of the study are, prediction equations and graphs for a large range of body positions and specific anthropometric variables; prediction equations and graphs describing how the base of the spine reference point moves in relation to defined seated and standing reference points for given reaches; a statistical tabulation with illustrations of 72 anthropometric dimensions. (Author)

DESCRIPTORS: (*Skeleton, *Anthropometry), (*Human engineering, Safety harness), Males, Mobility, Radiography, Photogrammetry, Spinal column, Head, Motion, Statistical analysis, Positioning reactions, Programming(Computers), Aircraft seats, Vehicles, Design

IDENTIFIERS: Functional torso configurations, Human torso mobility, Extremities motion

AD-754 924 NTIS Prices: PC\$6.75/MF\$0.95

Intercorrelations and Selected Descriptive Statistics for 96
Anthropometric Measures on 1549 Naval Aviation Personnel

Naval Aerospace Medical Research Lab Pensacola Fla (406061)

Medical research progress rept. no. 2

AUTHOR: Moroney, William F., Smith, Margaret J.

C0375K3 FLD: 1C, 5E, 51C, 95D USGRDR7306

Oct 72 106p

REPT NO: NAMRL-1165

PROJECT: M4305.08

MONITOR: 18

ABSTRACT: A previous report by the authors showed the need for cockpit designers to consider the correlations between anthropometric features when designing workspaces. It was proposed that both the correlations between anthropometric features and the normal bivariate distributions for specific correlations be made available to designers. The present report makes correlations between 96 anthropometric features available to designers.

DESCRIPTORS: (*Naval aircraft, Design), (*Cockpits, *Human engineering), (*Anthropometry, Naval personnel), Functional analysis, Design, Statistical processes, Optimization, Correlation techniques, Factor analysis

IDENTIFIERS: Normal bivariate distributions, *Workspace design

AD-754 780 NTIS Prices: PC\$3.00/MF\$0.95

Child Restraint Development

Michigan Univ., Ann Arbor. Highway Safety Research Inst.

Final rept. 1 Jul 71-28 Aug 72

AUTHOR: Roberts, Verne L.

C0343L3 FLD: 13L, 13P, 85D, 95D, 96D USGRDR7305

29 Sep 72 133p*

REPT NO: UM-HSRI-BI-72-1

CONTRACT: DOT-HS-031-1-180

MONITOR: DOT-HS-800 748

ABSTRACT: The report documents the results of the development of child restraint systems. Two child seats were designed and constructed which gave superior impact protection over those which are available commercially. In addition to the development of the child seats, performance standards and a compliance test procedure for the evaluation of child seating systems were developed. (Author)

DESCRIPTORS: (*Safety devices, *Children), (*Motor vehicles, Safety devices), Safety belts, Protection, Head (Anatomy), Thorax, Vulnerability, Design standards, Impact tests, Performance standards, Evaluation, Acceleration, Motion, Anthropometry

IDENTIFIERS: *Child restraint systems, *Child seating systems

PB-214 046/5 NTIS Prices: PC\$5.45/MF\$0.95

Verification of Test Procedures for Rulemaking - Motorcycle Headgear

Brown (Dayton T.), Inc., Bohemia, N.Y. (389 680)

Final rept. 27 Mar-12 Sep 72

AUTHOR: Scalone, A., Damis, R.

C0343E3 FLD: 6Q, 13L, 83B, 85D USGRDR7305

12 Sep 72 160p*

REPT NO: DBT-06R72-1323

CONTRACT: DOT-HS-005-2-336

MONITOR: DOT-HS-800 752

ABSTRACT: The report presents the results of a project to verify performance testing procedures to be incorporated in the Federal Motor Vehicle Safety Standard for Motorcycle Headgear. The areas under consideration are: Evaluation of impact test procedures for rigid anvil impacts using anthropometric style headforms in three sizes; rigid anvil impacts using a spherical headform; and rigid headgear impacts using spherical headform; Construction and testing of the head injury criterion data analysis system; Comparison of past and proposed methods of penetration tests. (Author)

DESCRIPTORS: (*Headgear, Motor vehicle operators), (*Motor vehicle operators, Motorcycles), Safety engineering, Standards, Crash tests, Evaluation, Impact tests, Data processing, Anthropometry

PB-214 014/3 NTIS Prices: PC\$3.00/MF\$0.95

A Projected Grid Method for Recording the Shape of the Human Face

Royal Aircraft Establishment Farnborough (England) (J10450)

Technical rept.

AUTHOR: Cobb, J.

C0262C3 FLD: 5E, 6K, 95D, 83B USGRDR7304

Sep 71 33p

REPT NO: RAE-TR-71184

MONITOR: DRIC-BR-28791

ABSTRACT: The report describes the work carried out to design an equipment which would quickly and cheaply record the shapes of a large number of human faces. It is intended for use in an anthropometric survey with a view to providing data for a project aimed at improving the fit and comfort of oxygen masks for Service use. The data will be examined to discover a parameter of the human face which can be used to determine which mask size is best suited to any individual. A simple, quick and adequately accurate equipment for recording one side of the face has been developed from an earlier design and includes several refinements to simplify the analysis. The accuracy of the equipment has been measured and is within the required one millimetre. (Author)

DESCRIPTORS: (*Face, Anthropometry), (*Anthropometry, Data processing systems), (*Oxygen masks, Design), Configuration, Human engineering, Instrumentation, Experimental design

IDENTIFIERS: *Grid method

AD-753 864 NTIS Prices: PC\$3.00/MF\$0.95

Empirical Reduction in Potential User Population as the Result of
Imposed Multivariate Anthropometric Limits

Naval Aerospace Medical Research Lab Pensacola Fla (406061)

Medical research progress rept. no.1

AUTHOR: Moroney, William F., Smith, Margaret J.

C0075F3 FLD: 5E, 1C, 95D, 51C USGRDR7302

21 Sep 72 16p

REPT NO: NAMRL-1164

PROJECT: M4305.08

MONITOR: 18

ABSTRACT: Data describing thirteen, cockpit related, anthropometric features of 1547 naval aviator personnel were examined. Two analyses were performed on these data. In the first analysis individuals not included within the 5th percentile to 95th percentile critical limits on any of the 13 features cited above were eliminated. After all 13 eliminations had been completed, 814 (52.6%) of the original 1547 naval aviator personnel had been excluded. In the second analysis, the critical limits were established at the 3rd and 98th percentiles, and 499 (32.2%) of the Personnel were excluded. Thus, where one might have expected only 10 per cent of the population to have been excluded, 52.6 per cent were excluded, and where only 5 per cent theoretically might have been excluded, 32.2 per cent were excluded. This seeming discrepancy may be attributed to the intercorrelations existing between the 13 variables. The importance of considering the relationship between anthropometric features in determining anthropometric compatibility is discussed. The preparation of bivariate data, which is not variable specific but which could be used when the correlation between anthropometric features is known, is proposed. (Author)

DESCRIPTORS: (*Anthropometry, Multivariate analysis), (*Cockpits, Design), Human engineering, Compatibility, Correlation techniques, Aviation personnel, Military requirements, Statistical analysis

IDENTIFIERS: Bivariate distribution, *Cockpit design

AD-752 032 NTIS Prices: PC\$3.00/MF\$0.95

Note on Anthropometric Technique: Anthropometric Measurements -- Right and Light Sides

Anthropology Research Project Yellow Springs Ohio (407444)

Technical note

AUTHOR: Laubach, Lloyd L., McConville, John T.

C0035J4 PLD: 6N, 57A USGRDR7301

1967 5p

CONTRACT: AF 33(615)-1101

PROJECT: AF-7184

TASK: 718408

MONITOR: AMRL-TR-67-82

Availability: Pub. in American Jnl. of Physical Anthropology, v26 n3 p367-369 May 67.

ABSTRACT: In order to discover whether statistically significant difference exist between measurements taken on the right and left sides of the body, 21 such anthropometric dimensions were compared. In eight cases significant differences were found. Six of these dealt with the forelimb, in which the dimension measured on the right side was greater. Since data on handedness is lacking, we do not know whether this is related to the handedness of the subjects. (Author)

DESCRIPTORS: (*Anthropometry, Aviation medicine), Legs, Arms, Males, Statistical data, Medical research

IDENTIFIERS: Skinfolks, Aerospace medicine

AD-751 734 NTIS Price: Reprint

Human Strength Simulations for One and Two-Handed Tasks in Zero Gravity

Michigan Univ., Ann Arbor. Engineering Human Performance Lab.
A5523I4 FLD: 5E, 58E, 95D STAR1020
Apr 72 155p
REPT NO: NASA-CR-115744
CONTRACT: NAS9-10973
MONITOR: 18

ABSTRACT: A description is given of a three dimensional hand force capability model for the seated operator and a biomechanical model for analysis of symmetric sagittal plane activities. The models are used to simulate and study human strengths for one and two handed tasks in zero gravity. Specific conditions considered include: (1) one hand active, (2) both hands active but with different force directions on each, (3) body bracing situations provided by portable foot restraint when standing and lap belt when seated, (4) static or slow movement tasks with maximum length of 4 seconds and a minimum rest of 5 minutes between exertions, and (5) wide range of hand positions relative to either the feet or bisection of a line connecting the hip centers. Simulations were also made for shirt sleeved individuals and for the male population strengths with anthropometry matching that of astronauts. (Author)

DESCRIPTORS: *Biodynamics, *Bionics, *Hand (anatomy), *Muscular strength, *Weightlessness, Anthropometry, Bibliographies, Human factors engineering, Simulation

N72-29084 NTIS Prices: PC\$9.75/MF\$0.95

Diver Anthropometrics

Navy Experimental Diving Unit Washington D C (253650)

Final rept.

AUTHOR: Beatty, Hugh T., Berghage, Thomas E.

A5211A4 FLD: 5E, 58E, 58F USGRDR7221

1 Jun 72 151p

REPT NO: NEDU-RR-10-72

PROJECT: NEDU-M4306

TASK: M4306.03

MONITOR: 18

ABSTRACT: To aid the design engineer in the development of future U. S. Navy diving systems and equipment a comprehensive anthropometric study was undertaken. Fifty-four anthropometric measures, two pulmonary function measures, and three derived body measures were obtained on 100, 41, and 100 U. S. Navy divers respectively. Descriptive statistics and measures of interrelationship are given for each measured and derived variable. The minimum number of anthropometric variables needed was determined by factor analysis. The measures obtained on the U. S. Navy divers were compared with anthropometric data available for the male aviation populations. (Author)

DESCRIPTORS: (*Anthropometry, Diving), (*Underwater equipment, Anthropometry), Design, Human engineering, Breathing apparatus

IDENTIFIERS: *Diving equipment

AD-748 627 NTIS Prices: PC\$3.00/MF\$0.95

Performance Concept in Buildings. Volume 2: Opening Addresses,
Rapporteur Reviews, and Discussions

National Bureau of Standards, Washington, D.C. Building Research Div.
(406 646)

Final rept.

AUTHOR: Foster, Bruce E.

A5142D3 FLD: 13M, 5E, 89E, 60H, 86V USGRDR7220

Sep 72 168p

REPT NO: NBS-SP-361-Vol-2

MONITOR: 18

Library of Congress Card No. 72-600005. Pub. in Proceedings of Symposium jointly sponsored by the International Union of Testing and Research Laboratories for Materials and Structures, France (RILEM); the American Society for Testing and Materials, Philadelphia, Pa.; and International Council for Building Research Studies and Documentation, Rotterdam, held at Philadelphia, Pa. 2-5 May 72.

Paper copy available from GPO \$1.75 as stock no. 0303-00039, C13.10:361-Vol-2.

ABSTRACT: The volume contains the opening addresses; the reports of the rapporteurs, which include a review of the papers and a general discussion in each of six areas. The subject matter covered in the papers includes physiological, anthropometrical, psychological, sociological, and economic human requirements and methods of evaluation; physical requirements and methods of evaluation in mechanical, acoustical, thermal, dimensional stability, compatibility, fire properties, and geometry areas; operation and maintenance requirements and methods of evaluation in such areas as maintenance, repair, replacement, and versatility; techniques and problems in applying the performance concept to design; and experience gained in application of the performance concept in design, building, and building use. (Author)

DESCRIPTORS: (*Buildings, Performance evaluation), (*Human factors engineering, Buildings), Design standards, Construction materials, Requirements, Anthropometry, Psychology, Sociology

COM-72-50850 NTIS Prices: PC-GPO/MF\$0.95-NTIS

Anthropometry of U. S. Army Aviators - 1970

Anthropology Research Project Yellow Springs Ohio (40/444)

Final rept. Nov 69-Dec 71

AUTHOR: Churchill, Edmund, McConville, John T., Laubach, Lloyd L., White, Robert M.

A4614E4 PLD: 6N, 56A USGRDR7215

Dec 71 345p

CONTRACT: DAAG17-70-C-0055

PROJECT: DA-1-T-062106-A-121

TASK: 1-T-062106-A-12102

MONITOR: C/PLSEL-95

See also AD-263 357.

ABSTRACT: The report describes an anthropometric survey of U. S. Army aviators conducted at Fort Rucker, Alabama in 1970. Data for 85 body size measurements and for several variables describing the Socio-military background of the survey subjects were gathered on a sample of 1482 flying personnel. Statistical summaries are presented for each measurement for the entire sample and for five subseries: enlisted men (crew chiefs, mechanics, door gunners), warrant officer and warrant officer candidate trainees, warrant officer rated pilots, commissioned trainees, and commissioned pilots. Summary statistics and percentiles for 80 anthropometric indices and for some 73 anthropometric variables computed from the measured dimensions are given, as is the correlation matrix for the measured variables and age. (Author)

DESCRIPTORS: (*Army personnel, *Anthropometry), (*Aviation personnel, Anthropometry), Statistical data

AD-743 528 NTIS Prices: PC\$6.00/MF\$0.95

The Body Size of Soldiers: U. S. Army Anthropometry - 1966

Army Natick Labs Mass Clothing and Personal Life Support Equipment Lab
(404487)

Final rept., 1966-71

AUTHOR: White, Robert M., Churchill, Edmund

A4613B1 FLD: 6N, 56A USGRDR7215

Dec 71 342p

REPT NO: C/PLSEL-94

PROJECT: DA-1-K-024701-A-122

TASK: 1-K-024701-A-12202

MONITOR: USA-NLABS-TR-72-51-CE

ABSTRACT: As a part of the U. S. Armed Forces anthropometric surveys of 1966, a sample of 6682 Army men was measured, including basic trainees, infantrymen, armored crewmen, and aviation personnel. Seventy body measurements were taken on each man. The anthropometric data from this survey are presented and discussed. These new data represent the first major updating of body size information on U. S. Army personnel since the Army anthropometric survey of 1946. Changes in the body size of Army men between 1946 and 1966 are discussed and the Army data are compared with anthropometric data from other services. (Author)

DESCRIPTORS: (*Army personnel, *Anthropometry), Statistical data

AD-743 465 NTIS Prices: PC\$6.00/MF\$0.95

Anthropometry of Air Force Women

Webb Associates Inc Yellow Springs Ohio (401286)

Final rept.

AUTHOR: McConville, John T., Churchill, E., Laubach, Lloyd L., Clauser, Charles E., Reardon, Joan A.

A4512B1 PLD: 5E, 58E USGRDR7214

Apr 72 1161p

CONTRACT: F33615-67-C-1772, F33615-71-C-1087

PROJECT: AF-7184

TASK: 718408

MONITOR: AMRL-TR-70-5

Library of Congress catalog card no. 72-600027.

ABSTRACT: The report describes and summarizes the results of an anthropometric survey of United States Air Force women carried out during 1968. Included in the report are a description of the methods and techniques used in the survey, descriptions--visual as well as verbal--of the measuring techniques used, and both uni- and bi-variate statistical summaries. A total of 137 anthropometric dimensions were measured on a sample of 1,905 US Air Force women: 548 officers or officer trainees and 1,357 enlisted women. This anthropometry included 5 measures of weight and fat thickness, 30 measures of body height and length, 26 measures of body girths, 15 measures of body breadths and depths, and 12 measures of body surface distance. There were, in addition, 30 measures of the head and face, 3 of the hand, and 2 of the feet. Thirteen measurements were remeasures of the subject while she was wearing a foundation garment. Background data gathered included age, rank, military occupation, birthplace, blood type, and age at menarche. (Author)

DESCRIPTORS: (*Anthropometry, Females), (*Air Force personnel, Females), Human engineering, Anthropology, Statistical analysis, Statistical data

IDENTIFIERS: WAF personnel

AD-743 113 NTIS Prices: PC\$15.00/MF\$0.95

An Annotated Bibliography of United States Air Force Applied Physical Anthropology

AeroSpace Medical Research Lab Wright-Patterson AFB Ohio (009850)

Bibliography Jan 46-Mar 72

AUTHOR: Kimbrough, Rena

A4505E2 FLD: 5E, 58E USGRDR7214

Mar 72 60p

REPT NO: AMRL-TR-71-15

PROJECT: AF-7284

TASK: 718408

ABSTRACT: The report contains the titles, authors, publication/source information, and the abstracts of 122 technical reports and articles published by Anthropology Branch of the Aerospace Medical Research Laboratory between January 1946 and March 1972. It is a detailed document of the scope of the effort of the Air Force in the field of applied physical anthropology to provide the information on human body size and biomechanical characteristics of Air Force personnel required for the development and evaluation of Air Force systems, personal-protective equipment and clothing. (Author)

DESCRIPTORS: (*Anthropology, Bibliographies), (*Anthropometry, Bibliographies), (*Human engineering, Anthropometry), Air Force personnel, Protective clothing, Muscles, Strength, Weight, Instrumentation

IDENTIFIERS: Biomechanics

AD-743 029 NTIS Prices: PC\$3.00/MF\$0.95

Improved and Simplified Methods for the Clinical Evaluation of Aircrew
Advisory Group for Aerospace Research and Development Paris (France)
(400043)

Conference proceedings no. 95

AUTHOR: Fuchs, Heinz S.

A4484D2 FLD: 6N, 57E USGRDR7214

Mar 72 83p

REPT NO: AGARD-CP-95-Pt-2

Presented at the Aerospace Medical Panel Specialist Meeting Held in
Luchon (France) 29-30 Sep 71. See also AD-742 496.

ABSTRACT: The volume contains a foreward, the papers, and the summaries of ensuing discussion at the AGARD/NATO Aerospace Medical Panel Specialist Meeting, held at Bagneres de Luchon, Haute Garonne, France, on 28-29 September 1971. The aim of the meeting was to facilitate an exchange of mutual information on 'Improved and Simplified Methods for the Clinical Evaluation of Aircrew'. 87 delegates from the various NATO aeromedical institutes, centers and establishments attended the meeting, representing 13 NATO nations. The 12 papers and one film presented had a close bearing on the practical aeromedical requirements, e.g. in cardiorespiratory assessment, spectometry, anthropometric methods, biochemical analyses, X-ray examinations, and special visual investigation methods etc. There was a valuable exchange of knowledge and views on methods, results, and approaches adopted by the various national aeromedical centers.

DESCRIPTORS: (*Flight crews, Medical examination), Symposia, Aviation medicine, Cardiovascular system, Respiratory system, Anthropometry, Vision, X rays, Diagnosis, Standards, Performance (Human)

AD-742 497 NTIS Prices: PC\$3.00/MF\$0.95

Anthropometry of Flying Personnel in the Royal Swedish Air Force

Royal Aircraft Establishment, Farnborough (England).

AUTHOR: Andrae, B. , Ekmark, J. , Laestadius, H.

A4453G4 FLD: 5E, 58E STAR1010

Sep 71 57p

REPT NO: RAE-LIB-TRANS-1502, BR27943

Tran- Transl. Into English of Kroppsmatt Foer Flygande Personal Inst.
of Aviation Med., Malmslaett, Sweden, Rept-689, 1968

ABSTRACT: During the year 1967-8 detailed anthropometry was carried out on a total of 240 flying personnel born 1925-7, 1939-40 and 1944. Factors influencing the general growth of the body are discussed and examples given from the study of increase in stature of Swedish inductees for military service during the last century. The measurements obtained and subsequent analysis have resulted in (1) suggested changes in standard requirements and enrolment regulations for flying personnel and (2) recommendations concerning future measurements and pattern for experiments. (Author)

DESCRIPTORS: *Anthropometry, *Flying personnel, *Human factors engineering, Aircraft equipment, Cockpits, Pilot performance, Statistical analysis, Sweden, Tables (data)

N72-19097 NTIS Prices: PC\$3.00/MF\$0.95

Human Force Exertions in Aircraft Control Locations

Webb Associates Inc Yellow Springs Ohio (401286)

Technical rept.

AUTHOR: Thordsen, Marvin L., Kroemer, K. H. Eberhard, Laubach, Lloyd L.

A4291H3 FLD: 1C, 5E, 51I, 58E USGRDR7212

Feb 72 83p

CONTRACT: F33615-71-C-1087

PROJECT: AF-7184

TASK: 718408

MONITOR: AMRL-TR-71-119

ABSTRACT: Experiments were conducted to measure the maximum isometric forces male subjects could exert at six locations of hand-operated aircraft controls. Forces were measured in two vertical and four to eight horizontal directions. The subjects (n=51) sat in a simulated aircraft seat and exerted forces on a cylindrical handle. Selected anthropometric dimensions were obtained on the subjects and compared with those from the 1967 USAF anthropometric survey of flying personnel. Summary statistics, including the mean, standard error of the mean, standard deviation, standard error of the standard deviation, coefficient of variation, symmetry, kurtosis, and selected percentiles, are presented for each of the 44 force exertion measures. (Author)

DESCRIPTORS: (*Flight control systems, *Human engineering), Man-machine systems, Aircraft seats, Pilots, Aircraft canopies, Control panels, Anthropometry, Optimization

IDENTIFIERS: Isometric forces, Biomechanics

AD-740 930 NTIS Prices: PC\$3.00/MF\$0.95

Driver Eye Position and Control Reach Anthropometrics. Volume II.
Dynamic Eye Position Study

Man Factors, Inc., San Diego, Calif. (406 172)

Final rept. 1 Jul 70-31 Oct 71

AUTHOR: Woodson, W. E.

A4224H2 PLD: 13F, 5E, 85D, 58E USGRDR7211

Oct 71 128p

REPT NO: MFI-71-117-Vol-2

CONTRACT: FH-11-7619

MONITOR: DOT-HS-800 619

See also Volume 1, PB-208 088.

ABSTRACT: The study defines the criteria, techniques and tools necessary to describe driver eye positions as they relate to motor vehicle standards development and compliance. (Author)

DESCRIPTORS: (*Motor vehicle operators, *Anthropometry), (*Motor vehicles, *Human factors engineering), Dynamics, Standards, Eye (Anatomy), Control, Acceptability

PB-208 089 NTIS Prices: PC\$3.00/MF\$0.95

Driver Eye Position and Control Reach Anthropometrics. Volume I.
Static Eye Position, Control Reach and Control Force Studies

Man Factors, Inc., San Diego, Calif. (406 172)

Final rept. 1 Jul 70-31 Oct 71

AUTHOR: Woodson, W. E.

A4224H1 FLD: 13F, 5E, 85D, 58E USGRDR7211

Oct 71 322p

REPT NO: MFI-71-117-Vol-1

CONTRACT: FH-11-7619

MONITOR: DOT-HS-800 618

See also Volume 2, PB-208 089.

ABSTRACT: The study defines the criteria, techniques and tools necessary to describe driver eye positions, control reach and operability as they relate to motor vehicle standards development and compliance. (Author)

DESCRIPTORS: (*Motor vehicle operators, *Anthropometry), (*Motor vehicles, *Human factors engineering), Standards, Eye (Anatomy), Performance, Control, Arm (Anatomy), Acceptability

PB-208 088 NTIS Prices: PC\$6.00/MF\$0.95

Biodynamic Modeling and Scaling: Anthropomorphic Dummies, Animals and Man

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Kornhauser, M.

A4193A1 FLD: 6S, 57W USGRDR7211

Dec 71 23p

REPT NO: AMRL-TR-71-29-Paper-6

PROJECT: AF-7231

Presented at the Symposium on Biodynamics Models and Their Applications held at Dayton, Ohio, on 26-28 Oct 70. Paper also included in AD-739 501, PC \$11.00, MF \$0.95.

ABSTRACT: After a brief outline of the applications and methods of biomechanics and the major sources of biodynamics data, the paper reviews the status of mathematical modeling, physical modeling (dummies) and scaling of models and damage levels. Biomechanics data required for preparing mathematical models, as well as for adjusting and validating the computer programs, are found to be insufficient for computational applications. Because of this paucity of supporting data, computer models are in general oversimplified and rudimentary, despite the availability of adequate computational techniques used in the aerospace industry. Physical models and the requirements for dynamic similarity are discussed. Although quantitative simulation is warranted under some circumstances, anthropomorphic dummies are expected to be of most value as visual aids and for purposes of demonstrating kinematic relationships between man and vehicle. Scaling from dummies to man and from animals to man is difficult to justify theoretically because of differences in structure, size and modes of failure. However, damage scaling in terms of the inputs (G and delta-V) required for failure, is shown to be accurate enough for purposes of rough approximation. (Author)

DESCRIPTORS: (*Stress(Physiology), Models(Simulations)), (*Anatomical models, Impact shock), (*Mathematical models, Impact shock), (*Impact shock, Humans), Anthropometry, Wounds + injuries, Predictions, Deceleration, Computers

IDENTIFIERS: *Biodynamics, *Biomechanics, Computer models

AD-740 443 NTIS Prices: PC\$3.00/MF\$0.95

Human Engineering the Keyboard

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Kroemer, K. H. Eberhard

A4184C1 FLD: 5E, 58E USGRDR7211

1972 14p

REPT NO: AMRL-TR-69-141

PROJECT: AF-7184

TASK: 718408

Availability: Pub. in Human Factors, v14 n1 p51-63 1972.

ABSTRACT: The standard typewriter keyboard serves as a model for keyboards of teletypewriters, desk calculators, consoles, Computer keysets, cash registers, etc. This man-machine interface should be designed to allow high-frequency, error-free operation with the least possible strain on the operator. This paper discusses several feasible biomechanical improvements of the keyboard. Some experimental findings are described which support the following design concepts: (1) the keys should be arranged in a 'hand-configured' grouping to simplify the motion patterns of the fingers; (2) the keyboard sections allotted to each hand should be physically separated to facilitate the positioning of the fingers; and (3) the keyboard sections allotted to each hand should be declined laterally to reduce postural muscular strain of the operator. (Author)

DESCRIPTORS: (*Human engineering, *Typewriters), Design, Operators(Personnel), Anthropometry, Hands, Operation, Efficiency

IDENTIFIERS: Keyboards

AD-740 259 NTIS Price: Reprint

Industrial Seating

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Kroemer, K. H. Eberhard

A3995A1 PLD: 5E, 6J, 58E, 57U USGRDR7209

1970 21p

REPT NO: AMRL-TR-70-11

PROJECT: AF-7184

TASK: 718408

ABSTRACT: Sitting as a working position is less fatiguing than standing, and can, therefore, be maintained longer. It is also a more stable posture and allows better controlled motions. The sitting posture should be upright but relaxed, without excessive curvatures of the spinal column, and with the thighs about horizontal. The seated person must be free to choose and change his posture; no specific postures should be forced upon him. There are many interactions among work station design, body posture of the worker, and task performance. Based on anthropometric and biomechanical data, design aspects of work seats as well as of foot rests, office equipment, consoles, work benches, machine stands, and the like are discussed. Recommended dimensions for such work stations are presented. (Author)

DESCRIPTORS: (*Human engineering, Seats), (*Seats, Industries), Design, Anthropometry, Anthropology, Posture, Performance(Human)

AD-739 170 NTIS Prices: PC\$3.00/MF\$0.95

Cockpit Geometry Evaluation. Volume IV. Mathematical Model

Boeing Co Seattle Wash Aerospace Group (059610)

Final rept. 1 Feb-31 Aug 70 on Phase 2A

AUTHOR: Healy, Michael J.

A3862L3 PLD: 1C, 5E, 51C, 58E USGRDR7208

Nov 71 110p*

REPT NO: D162-10128-2A

CONTRACT: N00014-68-C-0289

PROJECT: NR-213-065

MONITOR: JANAIR-701215

Revision of report dated Jan 70, AD-716 398. See also Volume 3, AD-738 007 and Volume 5, AD-738 009.

ABSTRACT: This volume describes the mathematical man-model of Phase II-A of the Cockpit Geometry Evaluation (CGE) Program and replaces the contents of the Phase II volume (D162-10128-2). The CGE Program is developing a computerized method to evaluate the physical compatibility of crew members with crew stations beginning with the conceptual phases of the design. A link system enclosed by geometrical shapes has been developed to date to model any specified sized member of a human population. The majority of the link connecting points represent major joint centers of the body and the geometric shapes, based on anthropometric data, represent body segments. (Author)

DESCRIPTORS: (*Cockpits, *Human engineering), Geometry, Flight crews, Anthropometry, Mathematical models, Compatibility, Anatomical models

IDENTIFIERS: Evaluation, Boeman man models

AD-738 008 NTIS Prices: PC\$3.00/MF\$0.95

World Diversity in Human Body Size and Its Meaning in American AID Programs

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Hertzberg, H. T. E.

A3775P2 FLD: 5E, 58E USGRDR7207

1968 5p

Availability: Pub. in Office of Aerospace Research Review, v7 n12
p14-17 Dec 68.

ABSTRACT: Mediterranean and Oriental populations have been compared with an American sample-selected because they all have been studied according to the same measuring techniques. The findings of this inquiry show that Americans really are among the largest-bodied people in the world; and this fact can have far-reaching implications, especially in terms of the clothing and equipment our nation furnishes under its Agency for International Development (AID) or military aid programs.

DESCRIPTORS: (*Anthropometry, *Foreign aid), Air Force personnel, Anthropology, Population, Body, Measurement, Standards

AD-737 412 NTIS Price: Reprint

Seating in Plant and Office

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Kroemer, K. H. Eberhard

A3675J4 FLD: 5E, 58E USGRDR7206

23 Apr 71 21p

REPT NO: AMRL-TR-71-52

PROJECT: AF-7184

TASK: 718408

Availability: Pub. in American Industrial Hygiene Association Jnl.,
v32 n10 p633-652 Oct 71.

ABSTRACT: Sitting as a working position is less fatiguing than standing and can, therefore, be maintained longer. It is also a more stable and allows better control of motions. Based on anthropometric and biomechanical data, design aspects of work seats as well as of foot rests, office equipment, consoles, work benches, machine stands, and the like are discussed. Recommended dimensions for such work stations are presented. (Author)

DESCRIPTORS: (*Seats, Design), (*Industrial medicine, Seats), (*Office equipment + supplies, Seats), Industrial plants, Anthropometry, Posture, Ergometers, Anatomy, Physiology, Fatigue (Physiology)

IDENTIFIERS: *Biomechanics

AD-736 108 NTIS Price: Reprint

The Human Buttocks in Sitting: Pressures, Patterns, and Palliatives

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Hertzberg, H. T. E.

A3584I2 FLD: 5E, 58E USGRDR7205

1972 11p

REPT NO: AMRL-TR-71-107

PROJECT: AF-7184

Presented at the Automotive Engineering congress held at Detroit Mich., on 10-14 Jan 72, Rept. no. 720005.

Availability: Paper copy available from Society of Automotive Engineers, Inc., 2 Pennsylvania Plazam New York 10001 \$2.00. No copies furnished by DDC or NTIS.

ABSTRACT: After a brief description of relevant buttock structure, the author presents summary data on buttock size, tuberosity locations, and other dimensions needed for improved seat design, as measured from a sample of 35 young males chosen to approximate the range of USAF flying personnel. Summary load patterns for two angles of seat back are shown, and suggestions to reduce the discomfort of long-continued sitting are made. Curves and data for successful USAF seat surfaces are presented. Citing recent increases in American body size, the author calls for an anthropometric survey on a national sample in which numerous data needed for automotive and other industrial design would be acquired. (Author)

DESCRIPTORS: (*Seats, Design), (*Anatomy, Seats), (*Human engineering, Seats), Humans, Anthropometry, Pilots

IDENTIFIERS: Buttocks

AD-735 316 NTIS Price: Not available NTIS

Selected Anthropometric Dimensions of Naval Aviation Personnel

Naval Aerospace Medical Research Lab Pensacola Fla (406061)
AUTHOR: Moroney, William F., Kennedy, Robert S., Gifford, Edmund C.,
Provost, Joseph R.
A3502E3 FLD: 6N, 70D, 56A USGRDR7204
10 Aug 71 28p
REPT NO: NAMRL-1141
PROJECT: MF12.524
TASK: MF12.524.002
MONITOR: NAVMED-MF12.524.002.5012DX5X-3

ABSTRACT: Since the previous study of the anthropometric features of naval aircrewmembers, the physical and academic requirements for entrance into the flight program have been changed. The present study was undertaken to determine whether these changes combine with changes in the anthropometric features of the population in general to influence certain anthropometric dimensions. The dimensions of the aviation training candidates in this study differed significantly from those reported in the other samples. Possible reasons for these differences include: growth of the population in general, characteristics of the samples involved, and different anthropometric and academic requirements for acceptance into the aviation training program.
(Author)

DESCRIPTORS: (*Naval personnel, *Anthropometry), (*Aviation personnel, Anthropometry), Military requirements, Naval training

AD-735 101 NTIS Prices: PC\$3.00 MF\$0.95

Breaking Strength of the Human Skull vs. Impact Surface Curvature

Wayne State Univ., Detroit, Mich. Dept. of Neurosurgery.

Final rept. 30 Jun 70-30 Jun 71

AUTHOR: Hodgson, Voigt R., Thomas, L. M.

A3334I3 FLD: 6E, 13L, 57X, 85E USGRDR7202

30 Jun 71 65p*

CONTRACT: FH-11-7609

MONITOR: DOT-HS-800583

ABSTRACT: Forty intact, moist, embalmed, human cadavers were dropped with their heads striking at various locations against several surfaces. Parameters measured and computed include drop height, velocity, force, head accelerations, pulse duration, injury indices, angular acceleration and anthropometry. Frontal flat plate impact data is compared to that obtained from the Alderson 50 percentile anthropomorphic dummy. The purpose of this research is to obtain impact data at skull fracture level which can be used to set Federal Motor Vehicle Safety Standards. (Author)

DESCRIPTORS: (*Skull, Fracture strength), (*Motor vehicle accidents, Injuries), Force, Acceleration tolerance, Breaking load, Neurosurgery, Anthropometry

PB-204 239 NTIS Prices: PC\$3.00/MF\$0.95

Anthropometry for Child Restraints

Harvard School of Public Health, Boston, Mass. Guggenheim Center for
Aerospace Health and Safety. (403 876)

Final rept.

AUTHOR: Stoudt, Howard W.

A3263J4 FLD: 6N, 13L, 13F, 58B, 83B, 85E USGRDR7201

Jul 71 66p

CONTRACT: FH-11-7333

MONITOR: DOT-HS-800 535

ABSTRACT: The report presents a review and discussion of anthropometric inputs which will describe children for purposes of crash kinematic modeling and construction of anthropometric dummies for use in crash tests. In addition techniques for obtaining such data are described. (Author)

DESCRIPTORS: (*Children, *Safety belts), (*Motor vehicle accidents, Collision research), (*Collision research, *Anthropometry), Mathematical models, Statistical data, Biometrics

IDENTIFIERS: Crash kinematic modeling

PB-204 186 NTIS Prices: PC\$3.00/MF\$0.95

Mathematical Simulation of Daisy Track Human Volunteer Tests

Michigan Univ., Ann Arbor. Highway Safety Research Inst.

Final rept. Aug 69-Dec 70

AUTHOR: Robbins, D. H., Snyder, R. G., Roberts, V. L.

A3201C3 FLD: 13L, 6S, 85E, 57W USGRDR7124

Jun 71 64p

REPT NO: HSRI-Bio-M-71-6

CONTRACT: FH-11-6962

MONITOR: DOT-HS-800 573

ABSTRACT: A study has been conducted as an initial step in determining the differences observed between the motions of a living human impact sled test subject and a dummy test subject. The mechanism which is proposed for accomplishing this is the HSRI Two-Dimensional Mathematical Crash Victim Simulator. A series of measurements were taken on human test subjects including classical and non-classical anthropometric measurements, range of motion measurements for the joints, and maximum foot force measurements. A series of mathematical expressions have been used to predict body segment weight, centers of gravity, and moments of inertia using the results of the various body measurements. It was then possible to prepare a data set for use with the mathematical model. In addition to the body measurements described above, it was necessary to determine the deceleration profile for the Daisy sled and to determine the geometry as well as the force-deformation characteristics for the seat and restraint environment. This being accomplished, a computer simulation of an impact sled test involving a human volunteer was made. The results are presented to conclude the report. (Author)

DESCRIPTORS: (*Impact acceleration, Humans), (*Traffic safety, Impact acceleration), Mathematical models, Computerized simulation, Simulators, Anthropometry, Body weight, Inertia, Gravity, Deceleration

IDENTIFIERS: *Restraint systems, Computerized simulation

PB-203 717 NTIS Prices: PC\$3.00 MF\$0.95

Acta Medica Iugoslavica. Volume 24, Number 2, 1970

National Science Foundation, Washington, D.C. Special Foreign Currency
Science Information Program.

A3124H3 FLD: 6E, 57E USGRDR7123

1971 103p

REPT NO: SPCSI-NLM(TT-70-56001/2)

Trans. of Acta Medica Iugoslavica, v24 n2 p83-191 1970, by Ivan
Stojanovic. The above journal is translated on a regular basis.

ABSTRACT: ;Contents: Connective tissue constituents of the human fetal lung; Morphologic and radiologic investigations of the optic canal; Determination of the capacity of the intracranial cavity in children by echo-encephalography; Radiographic anthropometric method for the determination of the volume of the endocranial cavity; Psychopathologic manifestations in exceptional stress situations; Familial occurrence of visceral erythematodes; Behavior of some enzymes from different structures studied on biopsy specimens of gastric mucosa in various pathological conditions; The Relation of gonads and suprarenals to the rate and duration of normal and abnormal growth; Are the etiology and pathogenesis of Angiokeratoma corporis circumscriptum naeviforme definitely explained; Focal lymphoid hyperplasia of gastric mucosa; Effect of ionizing radiation on the activity of coagulation factors.

DESCRIPTORS: (*Medical research, *Yugoslavia), (*Periodicals, Medical research), Lungs, Embryos, Tissues(Biology), Eye, Pathology, Radiology, Electroencephalography, Children, Anthropometry, Radiography, Stress(Psychology), Psychopathology, Skin diseases, Genetics, Enzymes, Gastrointestinal system, Hormones, Growth, Sex hormones, Brain, Radiobiology, Hematology, Blood coagulation, Translations

TT-70-56001/2 NTIS Prices: PC\$3.00 MF\$0.95

An Introduction to Relaxed Hand Anthropometry

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

Technical rept.

AUTHOR: Garrett, John W.

A3091H3 FLD: 5E, 58E USGRDR7123

Aug 71 9p

REPT NO: AMRL-TR-67-217

PROJECT: AF-7184

TASK: 718408

ABSTRACT: Anthropometric data comparing the length of the relaxed hand with the flat, straightened hand are presented. The correlation coefficient between the hand length in the two positions is not high. A forthcoming comprehensive research program on the anthropometry of the hand is revealed. (Author)

DESCRIPTORS: (*Anthropometry, *Hands), Reviews, Human engineering

AD-731 183 NTIS Prices: PC\$3.00 MF\$0.95

Development of a Dynamic Analog Anthropomorphic Dummy for Aircraft
Escape System Testing

Wyle Labs Rockville Md Payne Div (388542)

Final rept. 1 Jul 68-24 Feb 71

AUTHOR: Payne, Peter R., Band, Edward G. U.

A3021K4 FLD: 1C, 6N, 51C, 58D, 58E USGRDR7122

Aug 71 65p

REPT NO: Working Paper-59103-1, WR-71-15

CONTRACT: F33615-68-C-1731

PROJECT: AF-7231

TASK: 723101

MONITOR: AMRL-TR-71-10

ABSTRACT: Development and operational tests of aircraft escape systems require the use of anthropomorphic dummies which simulate both the dynamic influence of the occupant on the escape system trajectory and the dynamic response of the occupant to the escape system accelerations. The report sets forth the criteria, design features, manufacturing techniques and materials used in the development of a unique anthropomorphic dummy. (Author)

DESCRIPTORS: (*Escape systems(Aerospace), *Anthropometry), Analog systems, Design, Materials, Manufacturing methods, Simulation, Tests

IDENTIFIERS: *Aircraft escape systems

AD-730 634 NTIS Prices: PC\$3.00 MF\$0.95

NBS Voluntary Product Standard. Body Measurements for the Sizing of Women's Patterns and Apparel

National Bureau of Standards, Washington, D.C. (240 800)

AUTHOR: Devereux, C. W.

A2945H4 FLD: 5E, 58E, 69I, 86V USGRDR7121

Sep 71 34p

REPT NO: NBS-PS-42-70

Paper Copy available from GPO \$0.40 as stock no. 0303 0901, C13.20/42-70.

ABSTRACT: The purpose Of the Voluntary Product Standard is to provide standard classifications, size designations, and body measurements for consistent sizing of women's ready-to-wear apparel. The information is provided for the guidance of those engaged in producing or preparing specifications for patterns and ready-to-wear garments. It is also intended to provide the consumer with a means of identifying her body type and size from the wide range of body types covered, and to enable her to be fitted properly by a single size regardless of price, type of apparel, or manufacturer of the garment. (Author)

DESCRIPTORS: (*Clothing, *Standards), (*Patterns, Standards), Females, Anthropometry, Classification, Industries

IDENTIFIERS: *Body measurements, *Product standards, *Clothing patterns

COM-71-50347 NTIS Prices: PC-GPO/MF\$0.95-NTIS

The Human Buttocks in Sitting: Pressures, Patterns, and Palliatives

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Hertzberg, H. T. E.

A3975E3 FLD: 5E, 58E USGRDR7209

1972 10p

Availability: Pub. in the Proceedings of the Automotive Engineering Congress, Detroit, Mich., 10-14 Jan 72, p1-9. Paper no. 720005. No copies furnished by DDC or NTIS.

ABSTRACT: After a brief description of relevant buttock structure, the author presents summary data on buttock size, tuberosity locations, and other dimensions needed for improved seat design, as measured from a sample of 35 young males chosen to approximate the range of USAF flying personnel. Summary load patterns for two angles of seat back (pelvic inclination) are shown, and suggestions to reduce the discomfort of long-continued sitting are made. Curves and data for successful USAF seat surfaces are presented. Citing recent increases in American body size, the author calls for an anthropometric survey on a national sample in which numerous data needed for automotive and other industrial design would be acquired. (Author)

DESCRIPTORS: (*Joints(Physiology), Seats), (*Human engineering, *Seats), Anatomy, Body weight, Anthropometry, Design, Aircraft seats, Anthropology

IDENTIFIERS: *Buttocks

AD-738 708 NTIS Price: Not available NTIS

Handbook of Human Engineering Design Data for Reduced Gravity Conditions

General Electric Co., Philadelphia, Pa. Missile and Space Div.
AUTHOR: Marton, T. , Rudek, F. P., Miller, R. A., Norman, D. G.
A3921H1 FLD: 5E, 58E, 58F STAR1003
Oct 71 536p
REPT NO: NASA-CR-1726
CONTRACT: NAS9-8640, NAS8-18117

DESCRIPTORS: *Handbooks, *Human factors engineering, *Manned spacecraft, *Reduced gravity, *Spacecraft design, Anthropometry, Physiological factors, Weightlessness

N72-12048 NTIS Prices: PC\$6.00/MF\$0.95

ABSTRACT:

A Handbook is presented for the use of engineers, designers, and human factors specialists during the developmental and detailed design phases of manned spacecraft programs. Detailed and diverse quantified data on man's capabilities and tolerances for survival and productive effort in the extraterrestrial environment are provided. Quantified data and information on the space environment as well as the characteristics of the vehicular or residential environment required to support man in outer space are also given.

Evaluation of an Improved Flotation Device for Infants and Small Children

Civil Aeromedical Inst Oklahoma City Okla (084050)

AUTHOR: McPadden, Ernest B., Young, Joseph W.

A2933C2 FLD: 6G, 58D USGRDR7121

Jul 71 12p*

MONITOR: FAA-AM-71-37

ABSTRACT: A simple, lightweight, life-support infant flotation device incorporating reliable self-righting, thermal protection and automatic self-ventilation is described. This design concept utilizes prior data relative to the centers of gravity of infants and small children and exhibits excellent self righting. Thermal protection is incorporated through the use of insulative neoprene foam in construction of the submerged portion of the device. Anesthetized adolescent primates exhibiting body weights and metabolic requirements equivalent to that of an infant or small child were used to test and confirm ventilatory capability as induced by air or water motion. An evaluation of the capability of the device to deter shark attack indicated that the infant flotation device, when occupied by anthropomorphic dummies or anesthetized primates, was less attractive to sharks than anthropomorphic dummies wearing a standard yellow color inflatable life vest.

DESCRIPTORS: (*Life rafts, *Children), (*Infants, Sea rescue equipment), Flotation, Life support, Design, Test methods, Anthropometry, Sharks, Civil aviation

IDENTIFIERS: Evaluation

AD-729 836 NTIS Prices: PC\$3.00 MF\$0.95

Preliminary Survey of Diver Anthropometrics

Navy Experimental Diving Unit Washington D C (253650)

Final rept.

AUTHOR: Beatty, Hugh T., Berghage, Thomas E., Chandler, Donald R.

A2924H2 FLD: 5E, 58E USGRDR7121

1 Jun 71 28p

REPT NO: NEDU-RR-7-71

ABSTRACT: Anthropometric data for Navy Divers were collected and analyzed for mean, standard deviation, skewness and kurtosis. The data were analyzed by computer percentiles calculated and printed out. (Author)

DESCRIPTORS: (*Anthropometry, Naval personnel), (*Diving, Naval personnel), (*Underwater clothing, Design), Data, Statistical analysis, Tables

AD-729 664 NTIS Prices: PC\$3.00 MF\$0.95

Anthropometric Survey of the Imperial Iranian Armed Forces. Phase III. Technical Summary

Army Natick Labs Mass (040300)

AUTHOR: Kennedy, Stephen J., White, Robert M.

A2834C3 FLD: 5E, 6Q, 58E, 56A USGRDR7120

May 71 90p

Includes report on Combat Study Project Imperial Iranian Armed Forces.

ABSTRACT: The technical summary combines a report on Phase III of the Anthropometric Survey of the Imperial Iranian Armed Forces and the report on the Combat Boot Study Project. The report includes the technical summary on the application of the anthropometric data to uniforms and to combat footwear. (Author)

DESCRIPTORS: (*Anthropometry, *Iran), (*Armed Forces(Foreign), Anthropometry), Shoes, Clothing, Statistical data, Military requirements, Correlation techniques, Armed Forces(United States)

IDENTIFIERS: Combat boots

AD-728 822 NTIS Prices: PC\$3.00 MF\$0.95

Misconceptions Regarding the Design and use of Anthropomorphic Dummies

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Hertzberg, H. T. E.

A2663C1 FLD: 5E, 58E USGRDR7118

1970 6p

REPT NO: AMRL-TR-70-25

Availability: Pub. in MIRA Bull., n4 p17-21 Jul/Aug 70.

ABSTRACT: The MIRA Bulletin No. 5. 1969, contained an article in which the Sierra anthropometric dummy was discussed. Mr. Hertzberg, who is collaborating with American manufacturers on the development of dummies, submitted some comments which he has asked to be included in the Bulletin. A reply by the authors of the original article follows Mr. Hertzberg's comments.

DESCRIPTORS: (*Anthropometry, Models(Simulations)), Anatomical models, Design, Statistical analysis

AD-727 259 NTIS Price: REPRINT

'Average' Man is a Fiction: Range of Sizes is Key to Efficient Work Places

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Hertzberg, H. T. E.

A2663B4 FLD: 5E, 58E USGRDR7118

Sep 70 5p

REPT NO: AMRL-TR-70-58

PROJECT: AF-7184

TASK: 718408

Availability: Pub. in Contract, p86-89 Sep 70.

ABSTRACT: The brief article outlines the essential part that engineering anthropology plays in the multi-disciplinary field, and the methods of data-gathering and data-application developed for the military forces that can be used for civilian purposes as well, so as to improve houses, office furniture, home and industrial machinery, cars, trucks, mass-produced clothing, and all other equipment used or operated by man. (Author)

DESCRIPTORS: (*Anthropometry, Air Force research), Reviews

AD-727 258 NTIS Price: REPRINT

Databook for Human Factors Engineers. Volume 1 - Human Engineering Data

Man Factors, Inc., San Diego, Calif.

AUTHOR: Kubokawa, C. , Selby, P. , Woodson, W.

A2625H2 FLD: 5E, 58E STAR0914

Nov 69 260p

REPT NO: NASA-CR-114271

CONTRACT: NAS2-5298

DESCRIPTORS: *Anthropometry, *Environmental index, *Human behavior, *Human factors engineering, *Physiological factors, Equipment specifications, Graphs (charts), Manuals, Tables (data)

N71-25944 NTIS Prices: PC\$3.00 MF\$0.95

ABSTRACT:

Typical human engineering data useful in determining optimum design characteristics of equipment operated or maintained by human operators and/or maintenance personnel are presented. Anthropometry and equipment design are discussed as well as environmental conditions, and metabolic and behavioral factors.

A Computer Program for Calculating Parnell's Anthropometric Phenotype

Antioch Coll Yellow Springs Ohio (031300)

AUTHOR: Laubach, Lloyd L., Marshall, Margaret E.

A2385F2 FLD: 6N, 58F USGRDR7115

1970 10p

CONTRACT: AF 33(615)-5110, F33615-67-C-1310

PROJECT: AF-7184

MONITOR: AMRL-TR-68-151

Availability: Pub. in Jnl. of Sports Medicine and Physical Fitness,
v10 n4 p217-224 Dec 70.

ABSTRACT: A specific computer program was written and compiled for the calculation of Parnell's anthropometric phenotype. This computer program is illustrated and discussed. A total of 2420 male subjects from the 1967 United States Air Force Anthropometric Survey were phenotyped in this manner. Descriptive statistics for the phenotype distributions are given for the entire sample and the sample divided into 5-year age categories. (Author)

DESCRIPTORS: (*Anthropometry, *Computer programs), Physical fitness,
Air force personnel

IDENTIFIERS: Parnell anthropometric phenotype

AD-725 386 NTIS Price: REPRINT

The Adult Human Hand: Some Anthropometric and Biomechanical Considerations

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Garrett, John W.

A2281L2 FLD: 5E, 58E USGRDR7114

Apr 71 16p

REPT NO: AMRL-TR-69-122

PROJECT: AF-7184

TASK: 718408

AVailability: Pub. in Human Factors, v13 n2 p117-131 1971.

ABSTRACT: Recent studies of the anthropometry and selected biomechanical characteristics of hands are summarized. These include: conventional anthropometry of male and female hands; the anthropometry of the relaxed hand; comparison of certain engineering anthropometric and performance parameters between bare and pressure-gloved hands, the ability to retain grips on selected handles under high dynamic loads. The utility of these data for human factors engineering is discussed. (Author)

DESCRIPTORS: (*Hands, Anthropometry), (*Human engineering, Hands), Measurement, Rotation, Torque, Strength, Air Force equipment, Design

IDENTIFIERS: Biomechanics

AD-724 061 NTIS Price: REPRINT

Selected Bivariate Anthropometric Distributions Describing a Sample of
Naval Aviators - 1964

Naval Aerospace Medical Research Lab Pensacola Fla (406061)

AUTHOR: Moroney, William F.

A2205B4 FLD: 5E, 58E USGRDR7113

10 Mar 71 44p

REPT NO: NAMRL-1130

PROJECT: MF12.524.002

MONITOR: NAVMED-MF12.524.002-5013DX5X.1

ABSTRACT: Previous anthropometric surveys presented means, standard deviations, ranges, and percentiles as descriptors of the anthropometric features of aviator populations. These reports were limited to a consideration of each variable independently. However, designers also need knowledge of the interaction between variables in order to determine what proportion of the potential operator population their design decisions will eliminate. This report extends data previously collected from 1549 naval aviation personnel by presenting bivariate tables that illustrate the relationship between selected variables. Twenty-one tables were prepared which contained selected interactions between the following variables: biacromial diameter; buttock-knee length; eye height, sitting; functional reach; head height; knee height, sitting; sitting height; shoulder height, sitting; standing height; and thigh circumference. Means, standard deviations, ranges, regression equations, standard error of estimate, and percentile levels were also presented for each variable. (Author)

DESCRIPTORS: (*Anthropometry, *Aviation personnel), (*Human engineering, Aviation personnel), Tables

IDENTIFIERS: Aircrew station design

AD-723 796 NTIS Prices: PC\$3.00 MF\$0.95

A Collation of Anthropometry. Volume II, I-Z and Index

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Garrett, John W., Kennedy, Kenneth W.

A220113 FLD: 6P, 57A USGRDR7113

Mar 71 1077p*

REPT NO: AMRL-TR-68-1-Vol-2

PROJECT: AF-7184

TASK: 718408

See also Volume 1, AD-723 629.

ABSTRACT: The document is volume 2 of a two-volume collation of adult anthropometry, the sources for which are both domestic and foreign, male and female, military and civilian.

DESCRIPTORS: (*Anthropometry, Reviews), Males, Females, Military personnel, Civilian personnel, Adults, Europe, Asia, Australia, United States, Statistical data, Classification

IDENTIFIERS: Ethnic groups, *Collations

AD-723 630 NTIS Prices: PC\$12.00 MF\$0.95

A Collation of Anthropometry. Volume I, A-H

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Garrett, John W., Kennedy, Kenneth W.

A2201I2 FLD: 6P, 57A USGRDR7113

Mar 71 1122p*

REPT NO: AMRL-TR-68-1-Vol-1

PROJECT: AF-7184

TASK: 718408

Library of Congress catalog card no. 74-607818. See also Volume 2, AD-723 630.

ABSTRACT: The collation is a volume 1 of a 2-volume critical comparison of measuring techniques and anthropometric data from 48 American and foreign sources. Approximately 2000 dimensions cover the anthropometry from 16 countries. All titles and descriptions of dimensions from foreign references are presented in the original language as well as in English; in many instances the collation presents translations into English for the first time of classic anthropometric techniques that serve as the basis of the art. The presentation is such that each entry is complete in itself. All equivalent and nonequivalent dimensions of the same or similar title (or description) are cited and explicit differences, if any, are quoted. References to other anthropometric dimensions and data permit easy and quick comparisons, selection of appropriate dimensions, as well as precise understanding of measuring techniques. The data and techniques described are of direct use in the design of all types of equipment requiring the human operator; in the design and sizing of clothing; and will have academic, medical, and other biological applications.

DESCRIPTORS: (*Anthropometry, Reviews), Males, Females, Military personnel, Civilian personnel, Adults, Europe, Asia, Australia, United States, Statistical data, Classification

IDENTIFIERS: *Collations, Ethnic groups

AD-723 629 NTIS Prices: PC\$12.00 MF\$0.95

Human Factors Literature Relevant to Civil Aviation: A Guide for
Management and Design Engineers

Oklahoma Medical Research Foundation Oklahoma City (267650)

Final technical rept.

AUTHOR: Terry, Richard A., Rasmussen, Elizabeth A.

A2033C2 FLD: 1B, 5E, 51B, 58E USGRDR7111

Aug 66 76p

Sponsored in part by the Civil Aeromedical Inst., Oklahoma City, Okla.
and the Federal Aviation Agency, Oklahoma City, Okla. Office of
Aviation Medicine.

ABSTRACT: ;Contents: Human factors methods(systems design;
maintainability; use of simulators and computers in man-machine
studies); Accident investigation(incident analysis); Crash
safety(emergency evacuation and survival; restraint systems;
decelerative forces); Anthropometry and cabin design(biomechanics;
doors; seats; personal equipment); Equipment design(panels; displays;
instrument; workspace layout); Control system dynamics(simulation;
tracking); Visual factors in air navigation and ground control(Radar;
conspicuity; approach lighting); Airspace utilization(navigation; SST
profiles; automatic landing--adaptive control); Air traffic control
systems operation; Personnel factors(selection and training); Skilled
performance(fatigue; stress; work schedules; biological rhythms;
communication networks; speech and hearing information processing;
computer storage and retrieval); Environmental factors(lighting;
noise; temperature; ventilation; climate); Acceleration and
vibration(disorientation (vertigo)); Altitude physiology;
Toxicology(fuels; dusts; sprays; radiation; ozone); and Aircrew and
passenger comfort and health(preventive medicine; drugs; diets;
aging).

DESCRIPTORS: (*Civil aviation, *Bibliographies), (*Human engineering,
Civil aviation), Man-machine systems, Aviation accidents, Aviation
safety, Anthropometry, Aircraft cabins, Aircraft equipment, Air
traffic control systems, Navigation, Aviation personnel, Environment,
Aviation medicine, Toxicity

AD-722 161 NTIS Prices: PC\$3.00 MF\$0.95

Body Measurement Study of NJROTC Cadets

Navy Clothing and Textile Research Unit Natick Mass (388531)

Technical rept.

AUTHOR: Andruk, F. S.

A1685J3 FLD: 5E, 58E USGRDR7107

Jan 71 22p

REPT NO: TR-92

ABSTRACT: With the establishment of the Naval Junior Reserve Officers Training Corps (NJROTC) program, problems arose in connection with providing the cadets with uniforms of acceptable fit from the standard Navy adult size schedule. A body measurement study was conducted on a representative sampling of Junior Cadets and it was determined that, with the addition of two coat sizes, the adult size schedule range could be used to satisfactorily clothe 98 percent of the students enrolled in this program. Consequently, the establishment of a junior size schedule was not considered advisable. (Author)

DESCRIPTORS: (*Anthropometry, *Naval personnel), Clothing, Personnel, Adolescents

AD-718 349 NTIS Prices: PC\$3.00 MF\$0.95

BISRA Open Report. Selection of Abstracts From Ergonomics Abstracts'
Volume 2 No. 2

BISRA-The Corporate Labs. of the British Steel Corp., London
(England). Operational Research Dept.

A1632L3 FLD: 5H, 5E, 58E USGRDR7106

1970 14p

REPT NO: BISRA-OR/HF/35/70

See also Volume 1, No. 3, PB-194 443.

ABSTRACT: Contents: Man as a systems component - psychology, physiology, anthropometry and biomechanics; The design of the man-machine interface - data presentation, input facilities, workplace and equipment design, environmental design, noise, vibration, atmosphere, thermal conditions, specialised and protective clothing; Systems design and organisation - work organisation, training, motivation and attitudes; Methods, techniques and equipment in ergonomics - investigation of man as a systems component - physiology, anthropometry and biomechanics; Methods, techniques and equipment in ergonomics - investigation of the design of the man-machine interface - environmental design; Methods, techniques and equipment in ergonomics - investigation of systems design and organisation - work design and organisation, implementation and evaluation of industrial training procedures, and implementation of selection procedures.

DESCRIPTORS: (*Man machine systems, Abstracts), (*Human factors engineering, *Abstracts), Psychology, Physiology, Anthropometry, Environmental engineering, Workplace layout, Clothing, Design, Great Britain

IDENTIFIERS: *Ergonomics

PB-197 127 NTIS Prices: PC\$3.00 MF\$0.95

Body Composition in Relation to Muscle Strength and Range of Joint Motion

Antioch Coll Yellow Springs Ohio (031300)

AUTHOR: Laubach, Lloyd L.

A1461B3 FLD: 6C, 57A USGRDR7104

1969 13p

CONTRACT: AF 33(615)-1101, F33615-67-C-1310

PROJECT: AF-7184

TASK: 718408

MONITOR: AMRL-TR-67-135

Availability: Pub. in Jnl. of Sports Medicine and Physical Fitness, v9 n2 p89-97 Jun 69.

ABSTRACT: The data on 27 body composition, anthropometric and physical performance items were obtained from 45 male subjects and the interrelationships among these measures investigated. Many statistically significant ($p = .05$) zero-order correlations were found between the muscle strength and the body composition measures, but none between the range of joint motion measures and body composition. The somatotype components correlated much higher with measures of muscle strength when stature was partialled out of the correlation. The resulting correlations among the physical performance items and the body composition measures when body weight was held constant, were generally lower than the same zero-order correlations and first-order partial correlations (stature held constant). A few (6) significant correlations were found between the range of joint motion and body composition measurements when both stature and body weight were held constant. Multiple regression equations for the prediction of the physical performance items from the anthropometry and body composition measures are listed. These multiple correlations ranged from .506 to .747 and account for only 26% to 56% of the variance in performance. (Author)

DESCRIPTORS: (*Physical fitness, *Anthropometry), (*Body weight, Physical fitness), (*Muscles, Strength), Density, Body, Fats, Surface area, Anatomy, Correlation techniques

AD-716 632 NTIS Price: REPRINT

Cockpit Geometry Evaluation. Volume III. Computer Program

Boeing Co Seattle Wash Military Aircraft Systems Div (388616)

Final rept. 1 Jan-31 Dec 69 on Phase 2

AUTHOR: Katz, Robert, Rice, Ann, Nakagawa, Elsie I.

A1451D3 FLD: 1C, 5E, 51C, 58E USGRDR7104

31 Jan 70 434p*

REPT NO: D162-10127-2

CONTRACT: N00014-68-C-0289

PROJECT: NR-213-065

MONITOR: JANAIR-700203

See also Volume 2, AD-716 396, and Volume 4, AD-716 398.

ABSTRACT: The Cockpit Geometry Evaluation Program is a development of improved methods for evaluating the physical compatibility of crew members with crew stations. The heart of the program is a 23 joint, three dimensional man-model (BOEMAN-II) that simulates the motion of humans performing tasks in a given environment. The Computer Program System ties together all developments of the project. The System utilizes an updatable bank of anthropological and environmental data. The System provides information concerning reach capability, locations and orientation of joints and body segments during movement, and/or physical interference of BOEMAN-II with the crew station and with himself, numerical performance data on joint displacement and deflection and mass displacements. (Author)

DESCRIPTORS: (*Cockpits, *Human engineering), Geometry, Flight crews, Positioning reactions, Anthropometry, Performance (Human), Computer programs, Anatomical models

IDENTIFIERS: Evaluation, Boeman man models

AD-716 397 NTIS Prices: PC\$6.00 MF\$0.95

Cockpit Geometry Evaluation. Volume I. Program Description and Summary

Boeing Co Seattle Wash Military Aircraft Systems Div (J88616)

Final rept. 1 Jan-21 Dec 69 on Phase 2

AUTHOR: Ryan, Patrick W.

A1451D1 FLD: 1C, 5E, 51C, 58E USGRDR7104

Feb 70 123p*

REPT NO: D162-10125-2

CONTRACT: N00014-68-C-0289

PROJECT: NR-213-065

MONITOR: JANAIR-700201

See also Volume 2, AD-716 396.

ABSTRACT: The Cockpit Geometry Evaluation Program is an experimental development to establish a standardized method for evaluating the physical geometry of a crew station. It evaluates the physical compatibility of any sized seated crew member with any crew station beginning with the design concept. Data on the geometry of the crew station, the anthropometric characteristics of the crew members, and the sequence of tasks to be performed are stored in a computer. Mathematical routines provide dynamic movement for a variable-sized mathematical man-model. Numerical performance indicators, identification of physical and visual interferences, and reach infeasibilities are output. The program was originally planned as a six-phase development. Each sophisticating phase is designed to provide an immediately usable tool. The development is highly dependent on the laboratory acquisition of identified human data requirements. Volume I summarizes the results and techniques of Phase II, and gives a sample of input and output from the computer. (Author)

DESCRIPTORS: (*Cockpits, *Human engineering), Geometry, Flight crews, Anthropometry, Standardization, Design, Job analysis, Mathematical models, Positioning reactions, Anatomical models

IDENTIFIERS: Evaluation, Boeman man models

AD-716 395 NTIS Prices: PC\$3.00 MF\$0.95

Placement of Aircraft Controls

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

Technical rept.

AUTHOR: Garrett, John W., Alexander, Milton, Matthews, Chester W.

A1432G2 FLD: 1C, 5E, 51C, 58E USGRDR7104

Sep 70 459p*

REPT NO: AMRL-TR-70-33

PROJECT: AF-7184

TASK: 718408

ABSTRACT: Data are presented to guide the designer in placing aircraft controls to be operated by lightly clothed or pressure-suited aircrewmembers. The capabilities of 17 subjects wearing various combinations of personal equipment to reach 81 locations within a 180 deg arc forward of seat reference point were determined. Each subject was tested while wearing personal equipment, consisting of an underarm life preserver, parachute harness and, successively, a K2B flight coverall, an uninflated, and inflated A/P22S-2 full-pressure suit. The subjects sat in a seat configured to approximate Air Force specifications. During the test they were restrained in the seat by a lap belt and shoulder straps with the inertial reel locked and again with the inertial reel unlocked. Pictorial descriptions of the dimensions, the reach capabilities of each subject, and recommended design values are presented. (Author)

DESCRIPTORS: (*Cockpits, *Human engineering), Control knobs, Pilots, Positioning reactions, Aircraft seats, Pressure suits, Air force personnel, Anthropometry, Design, Standards

IDENTIFIERS: Design criteria

AD-715 975 NTIS Prices: PC\$6.00 MF\$0.95

Standardization of Tasks and Measures for Human Factors Research:
Proceedings of a Conference Held at Texas Tech University, Lubbock,
Texas, 18-19 March 1970

Human Engineering Labs Aberdeen Proving Ground Md (172850)

Technical memo.

A1225I4 FLD: 5E, 58E USGRDR7101

1970 110p*

REPT NO: HEL-TM-19-70

ABSTRACT: Contents: Is standardization necessary in human factors research; Data requirements for operational performance prediction; An approach to standarizing human performance assessment; Use of the synthetic-work technique in the assessment of sustained performance; Specification and measurement of intragroup coordination in various types of tasks and work groups; Considerations of fatness and body compositon in evaluating physical fitness and performance; and Physical and physiological measurements--are they interchangeable.

DESCRIPTORS: (*Human engineering, *Symposia), Standardization, Performance(Human), Psychometrics, Physical fitness, Anthropometry

IDENTIFIERS: Themis project

AD-714 669 NTIS Prices: PC\$3.00 MF\$0.95

WEIGHT, VOLUME, AND CENTER OF MASS OF SEGMENTS OF THE HUMAN BODY

Aerospace Medical Research Labs., Wright-patterson AFB, Ohio.

AUTHOR: Clauser, C. E., Mc Conville, J. T., Young, J. W.

A1085C3 PLD: 6P, 57S STAR0820

Aug 69 108p

REPT NO: NASA-CR-112672, AMRL-TR-69-70

CONTRACT: NASA ORDER R-90

DESCRIPTORS: *Anatomy, *Anthropometry, *Biodynamics, *Human body, Body size (biology), Body volume (biology), Body weight, Center of gravity, Tables (data)

N70-36813 CFSTI Prices: HC\$3.00 MF\$0.65

ABSTRACT:

The study was designed to supplement existing knowledge of the weight, volume and center of mass of segments of the human body and to permit their more accurate estimation on the living from anthropometric dimensions. Weight volume, and center of mass of 14 segments of the body were determined on 13 male cadavers. Descriptive statistics are presented of these variables as well as a series of regression equations predicting these parameters from anthropometry. Reports of studies are included of the mid-volume of segments as an approximation of their center of mass, relationships between standing and supine anthropometry, postmortem changes in gross body size, and comparisons between densities of fresh and preserved human tissues.

MEDICAL AND PHYSIOLOGIC EFFECTS OF EJECTION AND PARACHUTING AN
OVERVIEW

Army Aeromedical Research Lab Fort Rucker Ala (404578)

AUTHOR: Knapp, Stanley C.

A0962G2 FLD: 6G, 5E, 58D USGRDR7022

Aug 70 19p

REPT NO: USAARL-71-9

PROJECT: DA-3-A-062110-A-819

ABSTRACT: Design requirements for ejection seats and personal survival equipment sometimes omit as a criteria - man's physiologic and psychologic limitations. Man's ability to come through the ejection and parachute descent sequences uninjured is influenced directly by the design of the equipment and his experience in the techniques of proper use. Many limiting physiologic factors must be considered. Response to multiple accelerations in multiple axes, wind blast, effects of temperature extremes, anthropomorphic problems, and neuromuscular response are among the factors discussed. Engineers will find a knowledge of human factors vital to the design of seat restraint systems, cushions, accessory packs, control placement, catapults, the parachute, and etc. This broad overview reviews significant literature on sport free fall, military static line, HALO, and ejection parachuting statistics. Modes of injury and morbidity during ejection and parachuting are detailed. (Author)

DESCRIPTORS: (*Ejection seats, Human engineering), (*Parachute jumping, Wounds + injuries), Design, Anthropometry, Physiology, Acceleration tolerance, Temperature, Neuromuscular transmission, Aviation medicine, Aviation injuries, Stress (Physiology), Statistical data

AD-711 928 CFSTI Prices: HC\$3.00 MF\$0.65

PHYSIOLOGIC EVALUATION OF SEA SURVIVAL EQUIPMENT

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Pittman, J. C., Kaufman, W. C., Harris, C. E.

A0891E2 FLD: 6G, 6S, 58D, 57W USGRDR7021

Apr 69 5p

REPT NO: AMRL-TR-69-142

PROJECT: AF-7222

Availability: Pub. in Aerospace Medicine, v40 n4 p378-381 Apr 69.

ABSTRACT: A developmental insulated one-man life raft was compared to a standard life raft to determine if it provided significantly increased thermal protection in Arctic or sub-arctic conditions. Four healthy men with body builds varying from tall-thin to short-heavy were setted in sea water. They then entered both rafts which floated on 4 C sea water in a test chamber. Different air environments were: 4 C calm, -18 C calm, and 4 C with a 15-knot wind. Exposures were terminated at three hours, or when rectal temperature decreased to 35.5 C, or when extremity skin temperature decreased to 4 C. Average endurance times in the new raft were from 26 to 79 percent longer than exposures in the old raft. In the new raft subjects' rectal temperatures decreased at a rate about half that in the old raft. These physiologic data indicate the superiority of the developmental raft. Marked differences in the physiologic responses of the subjects could be correlated with differences in body build. Under identical environmental conditions, short-heavy subjects' exposure times were as much as twice as long as those of tall-thin subjects. The rate of rectal temperature decrease was in every case more rapid in thin subjects. For short-heavy individuals the new raft made little difference. For tall-thin subjects it could prove to be life saving. These results indicate some shortcomings of physical evaluation and suggest a standardized physiologic test procedure to evaluate new protective equipment. (Author)

DESCRIPTORS: (*Life rafts, *Thermal insulation), (*Sea rescue equipment, Arctic regions), Efficiency, Sea rescues, Body temperature, Endurance, Physiology, Stress(Physiology), Anthropometry

AD-711 452

STATIC AND DYNAMIC MEASUREMENTS OF MOTOR VEHICLE DRIVERS

Harvard School of Public Health, Boston, Mass. Guggenheim Center for Aerospace Health and Safety. (403 876)

AUTHOR: Stoudt, Howard W., Crowley, Thomas J., McFarland, Ross A., Ryan, Anthony, Gruber, Barry

A0845C1 FLD: 6N, 5E, 13P, 56A, 58E USGRDR7020

1970 249p*

CONTRACT: FH-11-6569

MONITOR: HS-800 261

ABSTRACT: The report contains the following information: (1) means, standard deviations and percentiles for 22 static body measurements related to the normal driving position on 1,033 adult subjects, male and female; (2) similar data for 203 pregnant females; (3) a review of sub-adult anthropometry including the tabular presentation of four basic measurements, and an extensive bibliography; (4) measurements on 100 drivers of functional arm reaches to 117 different points within the driver's work space; (5) an investigation of the means of presenting functional reach data from differing basic reference points within the driver's work space; and (6) an analysis of the relationships between static and functional anthropometric data, and the methods of predicting the latter from the former, including specific examples. In addition, extensive background material was presented on the ways in which the above tasks were achieved, including design and use of equipment, measuring techniques, selection and characteristics of subjects, methods of data analysis, etc. (Author)

DESCRIPTORS: (*Motor vehicle operators, *Anthropometry), Adults, Females, Humans, Human engineering, Posture, Passenger vehicles, Seats, Children, Statistical data, Positioning reactions

PB-193 605 NTIS Prices: HC\$3.00 MF\$0.65

WEIGHT, VOLUME, AND CENTER OF MASS OF SEGMENTS OF THE HUMAN BODY

Antioch Coll Yellow Springs Ohio (031300)

Final rept.

AUTHOR: Clauser, Charles E., McConville, John T., Young, J. W.

A0815G3 FLD: 6B, 57A, 56A USGRDR7020

Aug 69 111p

CONTRACT: F33615-67-C-1310, AF 33(615)-1101

PROJECT: AF-7184, NASA-Order-R-90

TASK: 718408

MONITOR: AMRL-TR-69-70

ABSTRACT: This study was designed to supplement existing knowledge of the weight, volume, and center of mass of segments of the human body and to permit their more accurate estimation on the living from anthropometric dimensions. Weight, volume, and center of mass of 14 segments of the body were determined on 13 male cadavers. Presented are descriptive statistics of these variables as well as a series of regression equations predicting these parameters from anthropometry. Included in the seven supporting appendices are reports of studies of the mid-volume of segments as an approximation of their center of mass, relationships between standing and supine anthropometry, postmortem changes in gross body size, and comparisons between densities of fresh and preserved human tissues. (Author)

DESCRIPTORS: (*Anthropometry, Models(Simulations)), Anatomy, Body, Body weight, Humans, Volume, Gravity, Tissues(Biology), Density, Statistical analysis

AD-710 622 CPSTI Prices: HC\$3.00 MF\$0.65

ANTHROPOMETRY OF THE AIR FORCE FEMALE HAND

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

Final rept.

AUTHOR: Garrett, John W.

A0761C2 FLD: 6N, 57A USGRDR7019

Mar 70 84p

REPT NO: AMRL-TR-69-26

PROJECT: AF-7184

TASK: 718408

ABSTRACT: The report describes 56 anthropometric dimensions measured on the hands of Air Force female personnel (Women in the Air Force, Nurse Corp, and Biomedical Science Corps), aged 18-56. Summary statistics including the means, standard deviations, ranges, selected percentiles, measures of distribution, and coefficients of variation are presented for the 56 dimensions. Also included are statistical variations by age, rank and Corps within the sample, a complete correlation matrix, bivariate tables, and nomographs for various selected combinations of dimensions.

DESCRIPTORS: (*Hands, Anthropometry), (*Air Force personnel, Females), (*Females, Hands), Statistical distributions, Measurement, Air Force research, Analysis of variance, Classification

AD-710 202 CFSTI Prices: HC\$3.00 MF\$0.65

ANTHROPOMETRY OF THE HANDS OF MALE AIR FORCE FLIGHT PERSONNEL

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

Final rept.

AUTHOR: Garrett, John W.

A0744G3 FLD: 6N, 5E, 57A, 58E USGRDR7019

Mar 70 84p

REPT NO: AMRL-TR-69-42

PROJECT: AF-7184

TASK: 718408

ABSTRACT: This report contains descriptions of and data on 56 anthropometric dimensions of the hands of 148 male Air Force flight personnel. Selected dimensional comparisons indicate that this sample is representative of the total group of Air Force flight personnel. Summary statistics presented include the means, standard deviations, ranges, selected percentiles, and coefficients of variation. Also included are data on the age, rank, major Air Command, and commissioned status of the sample; a complete matrix of intercorrelations among the anthropometric dimensions; bivariate tables; multiple regression equations; and nomographs for selected combinations of dimensions. A procurement table for the U.S. Air Force 12-size glove program revised to reflect the latest anthropometric data is presented. (Author)

DESCRIPTORS: (*Anthropometry, Air Force research), (*Hands, Configuration), Measurement, Flight crews, Statistical data, Statistical distributions, Joints, Analysis of variance, Gloves, Correlation techniques

IDENTIFIERS: Hand dimensions

AD-709 883 CFSTI Prices: HC\$3.00 MF\$0.65

AN ANTHROPOMETRIC SURVEY OF 200 RAF AND RN AIRCREW AND THE APPLICATION
OF THE DATA TO GARMENT SIZE ROLLS

Royal Aircraft Establishment, Farnborough (England). Engineering
Physics Dept.

AUTHOR: Bolton, C. B., Simpson, R. E.

A065414 FLD: 6Q, 6N, 83B, 56A STAR0814

1970 93p

REPT NO: ARC-R/M-3612, RAE-TR-67125

DESCRIPTORS: *Anthropometry, *Flight crews, *Protective clothing, Body
size (biology), Graphs (charts), Human factors engineering, Tables
(data)

N70-29085 CFSTI Prices: HC\$3.00 MF\$0.65

ABSTRACT:

An anthropometric survey of limited scope was undertaken in October and November 1966, involving 200 Royal Air Force and Royal Navy aircrew. The 44 measurements taken on each subject were mainly those used in the drafting of patterns for the RAF experimental range of aircrew functional garments. The acquired data were tabulated and presented in a form primarily suitable for functional clothing purposes. Analysis of the data supports the recommendation that size-rolls for one-piece garments in which a good torso fit is essential should be based on two direct body measurements, such as chest girth and torso hoop, rather than include one or more indirect measurements like weight or stature in the control parameters.

DETERMINATION OF CENTERS OF GRAVITY OF INFANTS

Civil Aeromedical Inst Oklahoma City Okla (084050)

AUTHOR: Swearingen, J. J., Badgley, J. M., Braden, G. E., Wallace, T. F.

A0593J3 FLD: 5E, 13L, 57A, 58E, 51G USGRDR7017

Nov 69 6p

MONITOR: FAA-AM-69-22

ABSTRACT: Recent efforts to provide effective restraint equipment for crash protection of infants in our transportation complex and to develop satisfactory flotation equipment for the little ones have revealed that there is a lack of data concerning the location of the c.g. (center of gravity) of this age group. This study was undertaken to fill this gap. Various body measurements were made on approximately 135 infants ranging in age from 2 months to 36 months and their c.g. determined from several body reference points on a specially constructed c.g. machine. Determinations of c.g. locations were made for the standing position only (actually supine) and it was found that the mean distance of the c.g. above the crotch for a 2-month-old infant (6.0 inches) is very close to that for a full-grown adult (5.9 inches). (Author)

DESCRIPTORS: (*Infants, *Center of gravity), (*Aviation safety, Infants), Wounds + injuries, Aviation injuries, Aviation accidents, Anthropometry

IDENTIFIERS: *Restraint systems

AD-708 514 CFSTI Prices: HC\$3.00 MF\$0.65

MOTORCYCLIST ANTHROPOMETRICS

Dunlap and Associates, Inc., Darien, Conn. (118 620)
AUTHOR: Pool, David C., Gordon, Douglas
A0553L1 FLD: 6N, 5I, 56A USGRDR7016
6 Mar 70 128p
REPT NO: SSD69-737
CONTRACT: FH-11-7249
MONITOR: HS-800 244

ABSTRACT: The anthropometric analysis task of this study was concerned with determination of 5th, 50th and 95th percentile leg and arm reach measurements within professionally acceptable confidence limits for motorcycle operators in a motorcycle seated position. The approach that was used involved establishing the age distribution of the United States motorcycle operator population so that appropriate anthropometric data could be defined using presently available information. The anthropometric data was defined using the age distribution of the motorcycle population as a cross-reference basis. Three sets of motorcycle anthropometric data were used to establish the leg and arm reach capability for short, average, and tall motorcycle operators. The anthropometric analysis was carried out, for leg and arm reach, by incrementing the various limb angles and evaluating the leg and arm reach capabilities. Envelopes of maximum foot reach of a motorcycle operator were developed for foot controls placed at various distances from the motorcycle centerline. Envelopes of maximum hand or arm reach of motorcycle operator were developed for hand controls placed various distances from the motorcycle seat top. (Author)

DESCRIPTORS: (*Motorcycles, Motor vehicle operators), (*Anthropometry, Motor vehicle operators), Arms, Legs, Weight, Stress (Physiology), Aging (Physiology), Sex

IDENTIFIERS: *Leg reach, *Arm reach, Seated position

PB-192 317 CFSTI Prices: HC\$3.00 MF\$0.65

BUOYANCY AND STABILITY CHARACTERISTICS OF THE HUMAN BODY AND PERSONNEL
FLOTATION DEVICES

Little (Arthur D) Inc Cambridge Mass (208850)

Final rept. Jun 69-Mar 70

A0532K4 FLD: 6G, 13L, 58D, 83C USGRDR7016

31 Mar 70 128p*

CONTRACT: DOT-CG-90511-A

PROJECT: CG-705106

ABSTRACT: A study was directed toward providing a technical basis on which to judge statistically the effectiveness of buoyancy and stability provided by personnel flotation devices for the general boating population. A detailed theory of PFD buoyancy and stability has been formulated. Statistical methods for evaluating the adequacy of the buoyancy and stability provided by a PFD in terms of fraction of the population adequately served have been developed. Tasks performed include a literature search, a theoretical analysis of the problem, a measurements program on a limited population to determine relevant physical characteristics, a statistical data analysis program to illustrate the adequacy of added buoyancy and stability in terms of fraction of the population served, and the design of a larger-scale test and analysis program to obtain statistically reliable data on the general boating population. (Author)

DESCRIPTORS: (*Buoyancy, Humans), (*Flotation, Materials), Boats, Water, Recreation, Stability, Body, Respiration, Population, Anthropometry, Measurement, Statistical analysis

AD-708 188 CPSTI Prices: HC\$3.00 MF\$0.65

VARIATIONS OF SPINAL ALIGNMENT IN EGRESS SYSTEMS AND THEIR EFFECT

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)
AUTHOR: Mohr, George C., Brinkley, James W., Kazarian, Leon E.,
Millard, Walter W.
A0531G4 FLD: 6G, 6E, 58D, 570 USGRDR7016
1969 8p
REPT NO: AMRL-TR-67-232
PROJECT: AF-7231
Availability: Pub. in Aerospace Medicine, v40 n9 p983-988 Sep 69.

ABSTRACT: Fractures of the vertebral column constitute a serious and undesirably common medical complication of otherwise successful ejections from high performance aircraft. The reported incidence of spinal compression fractures attributable to the ejection forces exhibits a more than tenfold variation when the specific fracture rates associated with the several aircraft-ejection-seat systems currently used by the United States and Allied Armed Forces are compared. A variety of seat design factors have been suggested as having primary causal importance to explain the observed difference in injury rates. A study was therefore conducted to investigate quantitatively the influence of seat geometry and personal equipment design factors on the intrinsic spinal curvature and vector relationship with the catapult thrust axis. Fourteen male Air Force volunteers, encompassing the 5-95 percentile range of sitting heights, were x-rayed while seated with an ejection posture in the F/RP-4C and F-105 ejection seat systems. Quantitative roentgenometric techniques were used to accurately determine individual vertebral body locations and measure absolute differences governed by seat design features. The sizable differences observed are discussed in terms of biodynamic injury mechanisms, and recommendations for improved seat design are derived. (Author)

DESCRIPTORS: (*Ejection seats, Design), (*Spinal column, Ejection seats), (*Wounds + injuries, Ejection seats), Anthropometry, Fractures(Bone), Jet fighters

IDENTIFIERS: F-105 aircraft, F-4 aircraft, F-4C aircraft, RF-4C aircraft

AD-708 123

THE CONFERENCE ON STANDARDIZATION OF ANTHROPOMETRIC TECHNIQUES AND TERMINOLOGY

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Hertzberg, H. T. E.

A0531F3 FLD: 6N, 56A USGRDR7016

1968 17p

REPT NO: AMRL-TR-67-180

PROJECT: AF-7184

TASK: 718408

Availability: Pub. in American Jnl. of Physical Anthropology, v28 n1
p1-16 Jan 68.

ABSTRACT: The conference was held to improve the comparability of anthropometric data from all workers, by establishing standards for the many new dimensions required in engineering anthropology, and by developing a terminology that reconciles the new standards with previous usages. In this effort, the group selected a list of dimensions (though with dissent on type and number) recommended as a minimum for all human biological surveys; and they chose from previous usage a terminological structure whose form, content and mode of presentation they recommended as standard practice by all anthropometrists. Both official and dissenting lists are presented, and the terminological structure is described, with examples. Despite solid progress toward a standardized technology encompassing both classical and modern practices, the conference left numerous points of technique or terminology unsettled, some of which are briefly described. (Author)

DESCRIPTORS: (*Anthropometry, *Symposia), Standardization, Vocabulary

AD-708 118

OBSERVATIONS ON THE RELATION OF HEIGHT OF HEEL AND SUPPORT IN ARCH OF SHOES TO FOOT PHYSIOLOGY IN MARCHING TROOPS

Army Medical Research Lab., Fort Knox, Ky. (039 650)

AUTHOR: Magee, R. B., Davis, G. C., Milstead, V. M.

A0455G4 FLD: 6N, 5E, 58E USGRDR7015

16 Sep 47 32p

REPT NO: USAMRL-10

PROJECT: AMRL-53-1

Distribution Limitation now Removed.

ABSTRACT: Tests were made of the value to foot health of support in the arch and heel of the feet of marching troops. The control shoes, Army service shoe, type III, and combat boots were compared with experimental shoes with a low heel, and with those in which steel shank support in the longitudinal arch had been removed. During the first few days of the experimental period, when the shoes were new, the highest incidence rates of lesions were reached for both control and experimental groups. There was no essential difference between the effect of the control and experimental shoes on the foot health of marching troops as evidenced by the frequency, type, duration, distribution, time of onset, and severity (march time lost due to lesions) of the clinical lesions present. In the shankless shoe experiment, the superficial lesions constituted 79% of all lesions, the deep lesions 21%; in the low-heel experiment, superficial lesions made up 57% of all lesions. The most common lesions were blisters, erythema, callus, and deep pain. Most lesions were located in the toe, metatarsal, and heel regions. (Author)

DESCRIPTORS: (*Military personnel, Shoes), (*Shoes, *Anthropometry), Feet, Physiology, Stress(Physiology), Human engineering, Design, Army personnel, Acceptability, Exercise, Wounds + injuries, Medical examination, Infantry

IDENTIFIERS: Comfort

AD-806 398 CFSTI Prices: HC\$3.00 MF\$0.65

ANTHROPOLOGICAL APPLICATIONS IN HIGH ALTITUDE FLIGHT SYSTEMS

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Alexander, Milton, Garrett, John W., Robinette, Joan C.

A0384K4 FLD: 5E, 6Q, 83B, 58E USGRDR7014

Mar 70 18p

REPT NO: AMRL-TR-70-3

PROJECT: AF-7184

TASK: 718408

ABSTRACT: The report reflects research on various phases of the dimensional requirements of the pressure suited man in the man-machine system. The spatial requirements for the man in a cockpit or capsule and an ejection and escape mechanisms or wearing clothing as protection against hostile environmental factors, such as heat, cold, vacuum, high g, and radiation, present separate problems for the design engineer that can be helped effectively with the applicable anthropological data. (Author)

DESCRIPTORS: (*Anthropometry, Man-machine systems), (*Flight clothing, *Human engineering), High altitude, Design, Pressure suits, Aviation personnel

AD-706 888 CPSTI Prices: HC\$3.00 MF\$0.65

THE ANTHROPOLOGY OF ANTHROPCMORPHIC DUMMIES

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

AUTHOR: Hertzberg, H. T. E.

A0365A2 FLD: 5E, 13L, 58E, 57A, 85E, 56A USGRDR7014

1969 24p

REPT NO: AMRL-TR-69-61

PROJECT: AF-7184

TASK: 718408

Pub. in Proceedings of the Stapp Car Crash Conference (13th), held in Boston, Mass., on 2-4 Dec 69. Paper no. 690805 p201-214 Dec 69.

ABSTRACT: The paper describes anthropological aspects of a cooperative program to create a 'family' of anthropomorphic dummies representative of the American population. The dummies are for use in crash-tests to improve public safety in motor vehicles. The anthropomorphic dummy is that type which closely approximates a given percentile level of the human body in size, form, segment mobility, total weight, segment weight, weight distribution and resiliency of its 'flesh' covering, and is usually able to withstand 100G. The history of this development is briefly sketched from its beginning in 1949. In the current program, the best available data have been chosen for three adult sizes: the 95th- and 50th-percentile males, and the 5th-percentile female. The body-forms being sculptured will provide a set of national standards for size, shape and weight. Future phases will involve the development of dummy organ-masses approximating the sizes and vibratory responses of those in the living torso. Deficiencies of the anatomical, anthropometric, biomechanical and physiological data used for these body-forms are noted, and suggestions are made for improvement, so that future dummies may be made more reliably representative of the using population. (Author)

DESCRIPTORS: (*Passenger vehicles, *Safety), (*Anatomical models, *Anthropometry), (*Motor vehicle operators, Anatomical models), Standardization, Impact tests, Posture

AD-706 411 CFSTI Prices: HC\$3.00 MF\$0.65

BULLETIN OF PROSTHETICS RESEARCH, FALL 1969

Veterans Administration Washington D C Prosthetic and Sensory Aids
Service (289370)

A0201H2 FLD: 6L, 923 USGRDR7012
1969 408p

REPT NO: BPR-10-12

See also AD-698 595.

Availability: Paper copy available from Superintendent of Documents,
GPO, Washington, D. C. 20402. \$1.75 VA 1.23-3:10-12.

ABSTRACT: Contents: The 'Interface' in the immediate postsurgical prosthesis; Below-knee amputation for vascular insufficiency--experience with immediate postoperative fitting of prosthesis; Some physiological and prosthetic considerations in the selection of amputation sites about the knee; Direct forming of below-knee PTB sockets with a thermoplastic material; Human locomotion; MultiChannel myoelectric control--experimental report; Guidelines for standards for externally powered hands; Hydraulic body-powered system for prosthetic devices; Summary report on research and development in the field of artificial limbs; An In Vivo study of axial rotation and immobilization at the lumbosacral joint; Materials problems in prosthetics and orthotics design and development; Limitations of chimpanzees as subjects in brace design experiments; Progress report: selection of students for orthotic-prosthetic educational programs; International conference on prosthetics and orthotics research; Head-shadow effect with conventional and cross-conduction eyeglass hearing aids; Summary report on the development of a reading machine for the blind; Metal molds; Prosthetics research study; Annual summary report, activities for year ended June 30, 1969.

DESCRIPTORS: (*Prosthetics, Reports), Artificial limbs, Control systems, Design, Anthropometry, Ear, Eye, Feet, Joints(Physiology), Materials, Casting, Medical research, Medical equipment

AD-704 689 CPSTI Prices: MF\$0.95

COCKPIT GEOMETRY EVALUATION. VOLUME IV. MATHEMATICAL MODEL

Boeing CO Seattle Wash Military Airplane Systems Div (388616)

Final rept. 15 Jan-31 Dec 68 on Phase 1

AUTHOR: Healy, Michael J., Katz, Robert

A0044E1 PLD: 5E, 5H, 1C, 907, 902 USGRDR7010

Jan 69 98p*

REPT NO: D162-10128-1

CONTRACT: N00014-68-C-0289

PROJECT: NR-213-065

MONITOR: JANAIR-960104

See also Volume 3, AD-703 260 and Volume 5, AD-703 271.

ABSTRACT: A mathematical model that positions and moves a variable sized 23-pin joint articulated stick-man in a crewstation environment is presented. The model simulates the motion of pilots in a given cockpit configuration considering gross reach capability required by a task. It utilizes a non-linear optimization technique to position and orient the joints, analyzes the viewing capability after the operation and detects body intersections with the seatback during the task. (Author)

DESCRIPTORS: (*Cockpits, Human engineering), (*Man-machine systems, Mathematical models), Anatomical models, Anthropometry, Performance(Human), Simulation, Mathematical analysis, Equations, Optimization

IDENTIFIERS: Computer analysis, Computerized simulation

AD-703 270 CPSTI Prices: HC\$6.00 MF\$0.95

COCKPIT GEOMETRY EVALUATION. VOLUME II. HUMAN DATA

Boeing Co Seattle Wash Military Airplane Systems Div (388616)

Final rept. 15 Jan-31 Dec 68 on Phase I

AUTHOR: Springer, Wayne E., Ryan, Patrick W.

A0044D3 FLD: 5E, 5H, 1C, 907, 902 USGRDR7010

Jan 69 297p*

REPT NO: D162-10126-1

CONTRACT: N00014-68-C-0289

PROJECT: NR-213-065

MONITOR: JANAIR-690102

See also Volume 1, AD-703 267 and Volume 3, AD-703 269.

PORTIONS OF THIS DOCUMENT ARE NOT FULLY LEGIBLE.

ABSTRACT: A computerized dynamic man-model is being developed as part of a contract administered by the Office of Naval Research (ONR) through the auspices of the Joint Army Navy Aircraft Instrumentation Research (JANAIR) Program Working Group. The baseline man-model to be developed in the first year of the proposed six-year program is a 23-joint articulated link 'stick-man'. The anthropometric, joint angular limit, mass, and visual characteristics used for the initial man-model (BOEMAN-I) are listed in this document. Present literature has been used whenever possible to provide these data. Boeing researchers have supplemented the literature information to complete that needed for BOEMAN-I. (Author)

DESCRIPTORS: (*Cockpits, Human engineering), (*Man-machine systems, Mathematical models), Anatomical models, Musculoskeletal system, Vision, Performance (Human), Joints (Physiology), Anthropometry, Statistical data, Specifications

IDENTIFIERS: Computer analysis, Computerized simulation, BOEMAN-1

AD-703 268 CFSTI Prices: HC\$6.00 MF\$0.95

SIZING STUDY: RAINCOAT, MAN'S, LIGHTWEIGHT, TAUPE 179

Quartermaster Research and Engineering Center Natick Mass (292840)

Research study rept.

AUTHOR: Newman, Russell W.

7402G1 FLD: 5E, 15E, 925, 907 USGRDR7008

23 Aug 60 15p

REPT NO: QREC-PA-22

PROJECT: AE-0033511

ABSTRACT: The purpose of the study was to relate the body size of men to the size of taupe raincoat which provides the best fit over both the winter service uniform (Army Green) and the summer service uniform (shirt and trousers, khaki). (Author)

DESCRIPTORS: (*Clothing, *Anthropometry), Measurement, Statistical analysis

IDENTIFIERS: Army uniforms

AD-701 873 CFSTI Prices: HC\$3.00 MF\$0.95

SIZING STUDY: EXPERIMENTAL SHIRT AND TROUSERS, MEN'S UTILITY

Quartermaster Research and Engineering Center Natick Mass (292840)

Research study rept.

AUTHOR: Newman, Russell W.

7402F1 FLD: 5E, 15E, 925, 907 USGRDR7008

13 Oct 60 11p

REPT NO: QREC-PA-23

ABSTRACT: The purpose of the study was to determine the garment fit and population coverage of a proposed size system of shirt and trousers, men's, utility, QMC clothing. (Author)

DESCRIPTORS: (*Clothing, *Anthropometry), Measurement, Statistical analysis

IDENTIFIERS: Army uniforms

AD-701 869 CFSTI Prices: HC\$3.00 MF\$0.95

ANTHROPOMETRIC DETERMINATIONS OF AMERICAN BORN MACACA MULATTA

Naval Aerospace Medical Inst Pensacola Fla (400580)

AUTHOR: Clark, Keith A., New, Albert E.

7325A3 FLD: 6C, 2E, 908 USGRDR7007

Jul 69 41p

REPT NO: NAMI-1078

PROJECT: MR011.01-8

MONITOR: NAVMED-MR011.01-8

ABSTRACT: Knowledge of anthropometric parameters of a group of American born Macaca mulatta became necessary for hardware design in the course of an orbiting primate experiment. The values obtained for 35 anthropometric parameters on 23 immature laboratory-born monkeys are presented. These parameters are classified according to age and sex of the animals and graded as to their reliability and reproducibility. The data can serve as baselines for extensive body measurements of the American born rhesus monkeys and can be useful any time these monkeys are used in experimental procedures. (Author)

DESCRIPTORS: (*Primates, *Anthropometry), Space biology, Experimental design, Laboratory animals, Materials, Sex, Aging (Physiology)

IDENTIFIERS: Macaca mulatta

AD-700 907 CPSTI Prices: HC\$6.00 MF\$0.95

BULLETIN OF PROSTHETICS RESEARCH, SPRING 1969

Veterans Administration Washington D C Prosthetic and Sensory Aids
Service (289370)

7105H2 FLD: 6L, 923 USGRDR7004

1969 357p

REPT NO: BPR-10-11

See also AD-686 954.

Availability: Paper copy available from Superintendent of Documents,
GPO, Washington, D. C. 20402. \$1.50.

ABSTRACT: Contents: The proposed 'Decade of Rehabilitation' - N. Acton; A report on the International Prosthetics Information Service Project; Five years of wheelchair evaluation; Some observations on the transverse rotations of the human trunk during locomotion; Hydraulic knee controls for knee-level amputations; Some design aspects of an experimental fluidic control system; Forming sockets directly on below-elbow stumps; The orthotic prescription derived from a concept of basic orthotic functions; Anthropometric studies of the human foot and ankle; UC-BL dual-axis ankle-control system and UC-BL shoe insert-biomechanical considerations; UC-BL dual-axis ankle-control system; UC-BL dual-axis ankle-control system-casting, alignment, fabrication, and fitting; UC-BL shoe insert-casting and fabrication; Socket pressure as a function of pressure transducer protrusion; Standards for ear restorations; Some functional and hygienic considerations in facial restorations. (Author)

DESCRIPTORS: (*Prosthetics, Reports), Artificial limbs, Control systems, Design, Anthropometry, Ear, Eye, Feet, Joints (Physiology), Materials, Casting, Posture, Medical research, Medical equipment

AD-698 595 CFSTI Prices: MF\$0.95

ANTHROPOMETRIC DIMENSIONS OF AIR FORCE PRESSURE-SUITED PERSONNEL FOR
WORKSPACE AND DESIGN CRITERIA

Aerospace Medical Research Lab Wright-Patterson AFB Ohio (009850)

Final rept.

AUTHOR: Alexander, Milton, Garrett, John W., Flannery, Michael P.
6915F1 PLD: 6N, 5E, 923 USGRDR7001

Aug 69 259p

REPT NO: AMRL-TR-69-6

PROJECT: AF-7184

TASK: 718408

Errata sheet inserted.

ABSTRACT: The results of an anthropometric survey of USAF personnel wearing the A/P22S-2 Full Pressure Suit fitted in accordance with the USAF Eight-Size, Height-Weight Sizing Program are presented. One hundred and thirty-eight measures were taken on each of thirty-four subjects standing, sitting and supine, with the suit in the uninflated, inflated, and inflated-restrained conditions. Forty circumferences were measured on a separate sample of thirty-two subjects standing and sitting, with the suit uninflated and inflated. Pictorial and verbal descriptions of the dimensions and detailed numerical results, including clearance ranges, are presented. Graphs comparing various dimensions across suit sizes are presented in the Appendix. (Author)

DESCRIPTORS: (*Anthropometry, Military personnel), (*Pressure suits, Military personnel), Design, Space flight, Efficiency

AD-697 022 CFSTI Prices: HC\$6.00 MF\$0.95

A SELECTED AND ANNOTATED BIBLIOGRAPHY OF KOREAN ANTHROPOLOGY

National Museum, Washington, D.C.

AUTHOR: Knez, Eugene I., Swanson, Chang-su

6771K4 FLD: 5K, 6C, 942 USGRDR6923

23 Nov 68 251p*

ABSTRACT: Contents: Korean cultural periods; Ethnology and Social Anthropology; Material culture; Linguistics; Physical anthropology.

DESCRIPTORS: (*Anthropology, Bibliographies), (*North Korea, Anthropology), (*South Korea, Anthropology), Culture, Linguistics, Archaeology, Social sciences, Anthropometry, Abstracts

IDENTIFIERS: *Korea, Ethnology, Social anthropology, Physical anthropology, Arts

PB-186 289 CFSTI Prices: HC\$6.00 MF\$0.95

ANTHROPOMETRY AND HUMAN ENGINEERING

Advisory Group for Aeronautical Research and Development Paris
(France) (005850)

6761K2 FLD: 5E, 1C, 907, 902 USGRDR6923

1955 122p

REPT NO: AGARD-ograph-5

NATO furnished. Symposium on Anthropometry, Human Engineering and Related Subjects conducted by the AGARD Aeromedical Panel, Scheveningen (The Netherlands), 3-4 May 54.

Availability: Pub. in Sales Dept., Pergamon Press, Inc., 44-01 21st St., Long Island City, N. Y. 11101. No copies furnished.

ABSTRACT: Contents: Body measurements in relation to work spaces in aircraft; Statistiques de biometrie medicale elementaire relatives au personnel navigant de l'armee de l'air francaise; Sheldon types and success in flight performance; Adapting the aeroplane to the pilot; Instrument dials, instrument arrangement, and cockpit design; A methodology for instrument display design; Factors affecting the validity and utility of aeromedical research data; The establishment of a longitudinal study of the medical and psychological aspects of the U.S. naval aviator; Somatotyping; Human factors in aircraft design.

DESCRIPTORS: (*Anthropometry, *Human engineering), Aircraft cabins, Pilots, Instrument panels, Cockpits, Aviation medicine, Naval personnel, Design

IDENTIFIERS: Somatotyping

AD-695 339

ANTHROPOMETRIC CHANGES ASSOCIATED WITH HIGH ALTITUDE ACCLIMATIZATION
IN FEMALES

Army Medical Research and Nutrition Lab Denver Colo (039600)

AUTHOR: Hannon, John P., Shields, J. L., Harris, Charles W.

6683E4 FLD: 6S, 923 USGRDR6922

1969 8p

Availability: Pub. in American Jnl. of Physical Anthropology, v31 n1
p77-83 Jul 69.

ABSTRACT: The anthropometric effects of prolonged high altitude exposure were studied in eight college women who lived on the summit of Pikes Peak (14,100 ft.) for 2.5 months. Acclimatization to altitude was associated with a decrease of skinfold thickness and a reduction in limb circumference, but little change in body weight. It was concluded that these changes reflected a loss of subcutaneous fat during the period of altitude exposure. Altitude exposure did not produce any alterations in trunk circumference at the umbilicus or buttocks, but it did cause an increase in the inspiratory chest circumference at the axillary level and a reduction in expiratory chest circumference at the subscapular level. (Author)

DESCRIPTORS: (*Anthropometry, High altitude), Adaptation (Physiology), Females, Acclimatization, Fats, Body, Musculoskeletal system, Body weight

AD-694 308

ANTHROPOMETRY OF AIR TRAFFIC CONTROL TRAINEES

Civil Aeromedical Inst Oklahoma City Okla (084050)

AUTHOR: Snow, Clyde C., Snyder, Richard G.

6312L4 FLD: 5E, 907 USGRDR6916

Sep 65 26p

MONITOR: FAA-AM-65-26

Also available as PB-169 870.

ABSTRACT: This report presents the body measurements of 684 air traffic control trainees enrolled in training programs conducted at the Federal Aviation Agency Aeronautical Center at Oklahoma City between August 12, 1960, and June 30, 1961. It includes the means, standard deviations, coefficients of variation, percentiles, and related statistics of 60 standard anthropometric and functional measurements. The survey was initiated to provide adequate criteria for improving the workspace design for the air traffic Controller and to provide anthropometric baseline data for future biometric and aging studies of Air Traffic Service personnel. (Author)

DESCRIPTORS: (*Air traffic controllers, Anthropometry), Civil aviation, Human engineering, Physical fitness, Correlation techniques, Stress(Physiology), Aging(Physiology), Statistical data, Classification, Background, Body, Measurement, Predictions, Students

AD-689 810 CPSTI Prices: HC\$6.00 MF\$0.95

THE ANGLE OF SHOULDER SLOPE IN NORMAL MALES AS A FACTOR IN SHOULDER-HARNESS DESIGN

Civil Aeromedical Inst Oklahoma City Okla (084050)

AUTHOR: Snow, Clyde C.

6312L2 FLD: 6Q, 5E, 13L, 941, 907 USGRDR6916

Mar 65 5p

MONITOR: FAA-AM-65-14

Also available as PB-169 175.

ABSTRACT: In order to establish criteria for more comfortable shoulder-harness design, this study was conducted to determine the angle of slope of the top of the shoulders where poorly fitting shoulder harness may produce discomfort and, occasionally, functional impairment through compression of the underlying soft tissues. The mean shoulder-slope angle (measured from the vertical body axis) of normal males based on this study of 55 Air Traffic Service trainees is 67.5 deg. with a standard deviation of 5.0 deg. (Author)

DESCRIPTORS: (*Safety harness, Anthropometry), Civil aviation, Human engineering, Statistical data, Photographic techniques, Arms, Muscles, Design, Analysis of variance

IDENTIFIERS: Shoulder harnesses

AD-689 808 CPSTI Prices: HC\$3.00 MF\$0.95

SELECTED ANTHROPOMETRIC MEASUREMENTS OF 1640 U. S. ARMY WARRANT
OFFICER CANDIDATE FLIGHT TRAINEES

Army Aeromedical Research Lab Fort Rucker Ala (404578)
AUTHOR: Schane, William P., Littell, Delvin E., Moultrie, Charles G.
6243C3 FLD: 5E, 1C, 907 USGRDR6915
Feb 69 81p
REPT NO: USAARL-69-2
PROJECT: DA-3-A-025601-A-819
TASK: 3-A-025601-A-819054

ABSTRACT: The results of nine anthropometric measurements conducted upon 1,640 U. S. Army warrant officer candidates are presented. The nine measurements were selected as those which contribute most to aircrew workspace design in aircraft. Comparison of these data was performed against similar measurements conducted upon flying personnel in five separate studies by other military services. (Author)

DESCRIPTORS: (*Cockpits, Design), (*Aviation personnel, Human engineering), Anthropometry, Military personnel, Correlation techniques, Measurement, Human engineering, Safety, Tables, Regression analysis, Army aircraft

AD-688 856 CPSTI Prices: HC\$6.00 MF\$0.95

BODY-COMPOSITION METHODOLOGY IN MILITARY NUTRITION SURVEYS

Army Medical Research and Nutrition Lab Denver Colo (039600)

AUTHOR: Krzywicki, Harry J., Consolazio, C. Frank

618413 PLD: 6P, 6H, 5I, 923 USGRDR6914

1967 21p

Availability: Pub. in Proceedings of a Symposium, National Academy of Sciences, Washington, D. C., Body Composition in Animals and Man, p492-511, n.d. Pub. no. 1598.

ABSTRACT: A series of nutrition surveys were carried out on troops living in military camps throughout the United States, under varied conditions of temperature and environment (heat, cold, and altitude), and on troops performing light, moderate, and heavy physical activities. The data include information on food intake, body composition, anthropometric measurements, maximal work performance, and biochemical evaluation. Data are now being compiled, by age groups, at each military camp to determine the interrelationships and intrarelationships existing between nutritional status, work performance, and body composition. (Author)

DESCRIPTORS: (*Military rations, Nutrition), (*Military personnel, Performance(Human)), Potassium, Water, Body weight, Lipids, Anthropometry, Muscles, Performance(Human), Radioactive isotopes, Tracer studies, Symposia

IDENTIFIERS: Evaluation, Body composition

AD-687 904 CFSTI Prices: HC\$6.00 MF\$0.95

REVIEW OF PHYSIOLOGICAL MEASUREMENT TECHNIQUES FOR APPLICABILITY TO
SPACE FLIGHT CONDITIONS

Lovelace Foundation for Medical Education and Research, Albuquerque,
N. Mex. Dept. of Aerospace Medicine and Bioastronautics.

AUTHOR: Fraser, T. M.

586113 FLD: 6B STAR0707

Feb 69 256p

REPT NO: NASA-CR-1277

CONTRACT: NASR-115

1969 Coll- 256 P Refs

DESCRIPTORS: *Anthropometry, *Bioastronautics, *Cardiography,
*Respiratory physiology, *Space flight stress, Biotelemetry, Manned
orbital laboratories, Stress (physiology)

N69-18085 CFSTI Prices: PC\$6.00 MF\$0.95

ABSTRACT:

Techniques in the fields of cardiovascular and respiratory function are examined, and approaches to anthropometric and body composition are discussed with a view toward those techniques which might be most useful in work to be performed in a manned space laboratory. Rather than claiming to be a comprehensive review, this study emphasizes areas where the information to be gained is significant but where techniques available do not readily lend themselves to use in space or where a multitude of available techniques requires consideration.

ANTHROPOMETRY OF JAPANESE PILOT

Japanese Air Self-Defense Force, Tokyo. Aero-Medical Lab. (190 625)

Final rept. Mar 61-Mar 62

AUTHOR: Oshima, M., Fujimoto, T., Oguro, T., Tobimatsu, N., Mori, T.

5842B1 PLD: 6N USGRDR6909

Mar 65 114p

PROJECT: AF-7184

TASK: 718408

MONITOR: AMRL-TR-65-74

Pub in Reports of the Aero-Medical Lab., v2 n2 Mar 62. Distribution Limitation now Removed.

ABSTRACT: The results of an anthropometric survey of 239 pilots of the Japanese air self-defense force are presented. The survey took place in the spring of 1961 at five air bases located throughout Japan. Sixty-two body dimensions were measured on each subject by JASDF flight surgeons. Measurements of the head, face, trunk, arms, and legs were included for the purpose of sizing and designing pressure suits and associated protective gear for use in the F-104J weapon systems program. The percentiles, means, standard deviation, range and coefficient of variation are presented for each body measurement. Comparisons with the 1950 USAF flying population are included. A detailed description is given for each measurement accompanied by explanatory diagrams. A four-size, height-weight program for JASDF pilots is presented for use by protective equipment designers. (Author)

DESCRIPTORS: (*Anthropometry, Pilots), (*Pilots, Japan), Japan, Body weight, Extremities, Head, Body, Measurement, Pressure suits, Feasibility studies, Jet fighters, Flight clothing

IDENTIFIERS: Height

AD-462 062 CFSTI Price: PC\$6.00

RELIABILITY OF MEASUREMENTS IN THE PROPOSED PHYSICAL FITNESS TEST FOR
WOMEN MARINES

Naval Medical Field Research Lab Camp Lejeune N C (249600)

Interim rept.

AUTHOR: Rasch, Philip J., Hamby, Jefferson W., Harrelson, W. T.

569111 FLD: 6N USGRDR6907

Dec 67 20p

REPT NO: NMFRL-Vol-XVII/No-19

MONITOR: NAVMED-MF022.01.04-8003-4

ABSTRACT: Test-retest coefficients of reliability were determined for the measurements in the proposed new physical readiness test for Women Marines. The four-block shuttle run was included for comparison with the two-block shuttle run, and selected anthropometric data were recorded on the subjects. The coefficients of reliability were satisfactorily high. The four-block shuttle run gives a better distribution of the data and a higher reliability coefficient than does the two-block shuttle run and it is recommended that the former replace the latter in the test battery. The subjects were found to have proportionately larger waist and hip girths than are considered 'ideal' at the present time. (Author)

DESCRIPTORS: (*Physical fitness, *Anthropometry), (*Females, *Marine Corps), Reliability, Measurement, Selection, Correlation techniques, Performance tests, Exercise, Military training

IDENTIFIERS: Women Marines

AD-682 243 CFSTI Prices: PC\$6.00 MF\$0.95

CLEARANCE AND PERFORMANCE VALUES FOR THE BARE-HANDED AND THE
PRESSURE-GLOVED OPERATOR

Aerospace Medical Research Labs Wright-Patterson AFB Ohio (009850)

Final rept.

AUTHOR: Garrett, John W.

5655F2 FLD: 5E, 6Q USGRDR6907

Aug 68 164p*

REPT NO: AMRL-TR-68-24

PROJECT: AF-7184

TASK: 718408

ABSTRACT: The report summarizes hand and arm dimensional, clearance, and strength data of 27 adult males wearing the A/P22S-2 full-pressure suit. Thirty-six measures were obtained under each of three conditions: bare-handed; gloved and unpressurized; and gloved and pressurized. The data are both summarized for all subjects and reported independently by glove size worn. Uses of the data are suggested and specific design values recommended. (Author)

DESCRIPTORS: (*Pressure suits, Human engineering), (*Gloves, Performance tests), Operators(Personnel), Anthropometry, Strength, Performance(Human), Design, Effectiveness, Aerospace craft, Statistical processes, Hands, Tables

IDENTIFIERS: *Pressurized gloves, Dimensions, Clearance

AD-681 457 CFSTI Prices: PC\$6.00 MF\$0.95

ANTHROPOMETRIC SURVEY OF THE ROYAL THAI ARMED FORCES

Army Natick Labs., Mass. (040 300)

AUTHOR: White, Robert M.

5625L1 FLD: 5E, 6N USGRDR6906

Jun 64 62

ABSTRACT: An anthropometric survey of military personnel of the armed forces of Thailand was conducted between October 1962 and March 1963. Body measurements were obtained on a total series of 2,950 men, consisting of 2,010 of the Royal Thai Army, 610 of the Royal Thai Marine Corps, and 330 of the Royal Thai Air Force. Fifty-two measurements were made on each individual. The anthropometric data have been analyzed and are presented. The average height and weight of Thai military personnel were equivalent to the 5th percentile values of height and weight for United States soldiers. The Thai soldier is about four inches shorter in stature and 30 pounds lighter in weight than the average United States soldier. The results of the survey, which provide information on the body size of Thai military personnel, may be utilized in the engineering design and sizing of clothing and equipment intended for use by the Royal Thai armed forces. (Author)

DESCRIPTORS: (*Anthropometry, Military personnel), (*Military personnel, Thailand), Body weight, Statistical data, Clothing, Design, Human engineering, Population, Tables

IDENTIFIERS: Height

AD-450 836 CFSTI Price: PC\$6.00

A PORTABLE TEST BATTERY FOR COMPARATIVELY EVALUATING OPERATOR
PERFORMANCE IN FULL-PRESSURE SUIT ASSEMBLIES

Applied Psychological Services Inc Wayne Pa Science Center (402774)

Final rept. Jun 67-Mar 68

AUTHOR: Siegel, Arthur I., Lanterman, Richard S.

5601D4 FLD: 6Q, 5E USGRDR6906

Oct 68 86p

CONTRACT: F33615-67-C-1755

PROJECT: AF-7184

TASK: 718402

MONITOR: AMRL-TR-68-74

ABSTRACT: Recommendations for a portable battery of tests to assess human mobility in full-pressure suits are presented. The literature was reviewed to determine the types of instruments and tests employed by prior investigators. Task analyses were performed on three advanced vehicles to determine the body member-movement families most frequently involved. A set of tests and measurements is suggested for those member-movement families found to be most frequently involved in advanced flight. Necessary future steps for realizing the portable battery are suggested. The test battery recommended includes the Purdue Peg Board for finger dexterity, a specially designed apparatus for the strength of various body movements, a single dimension tracking task for various coordination tests, a Leighton Flexometer, and direct measurement devices for range of movement and static anthropology measurements. (Author)

DESCRIPTORS: (*Pressure suits, Performance(Human)), Test methods, Test equipment, Human engineering, Jet fighters, Lunar craft, Mobility, Portable, Tracking, Pulse rate, Anthropometry

IDENTIFIERS: Purdue peg board, Leighton flexometers, F-111 aircraft, Lunar excursion modules, Dexterity, Evaluation

AD-680 825 CPSTI Prices: PC\$6.00 MF\$0.95

A DEVELOPMENT IN COCKPIT GEOMETRY EVALUATION

Boeing Co Seattle Wash (059600)
AUTHOR: Hickey, Leo F., Springer, Wayne E., Cundari, Francis L.
5595J3 FLD: 1C, 5E USGRDR6906
Nov 68 54p*
REPT NO: D6-53594
CONTRACT: N00014-68-C-0289
PROJECT: NR-213-065

ABSTRACT: The overall problem of cockpit evaluation is discussed. Within this context, the specific problem of cockpit geometry evaluation is explored. Known methods for evaluating geometry (the physical layout of the entire cockpit complex-displays, controls, seats, personal equipment, windshield/canopy, interior surface shape, openings for ingress and egress) are summarized. Their advantages and disadvantages are presented. The application of modeling techniques that take advantage of computer capability to improve geometry evaluation is discussed. A research program, in progress, directed toward the full development of a computerized model of the physical aspects of flight crewmen and any cockpit configuration is presented in some detail. (Author)

DESCRIPTORS: (*Cockpits, *Human engineering), Geometry, Positioning reactions, Flight crews, Aircraft equipment, Man-machine systems, Configuration, Anatomical models, Programming (Computers), Anthropometry, Flight simulators

IDENTIFIERS: Evaluation, Computerized simulation, Boeman man models

AD-680 799 CFSTI Prices: PC\$6.00 MF\$0.95

ANTHROPOMETRY AND TEMPORO-SPATIAL ENVIRONMENT

Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.

AUTHOR: Roth, E. M.

5532E2 FLD: 6N STAR0702

Nov 68 97p

the AeroSpace Environ. Nov. 1968 (See N69-12592 02-04) Coll- 97 P Rets

DESCRIPTORS: *Anthropometry, *Manned space flight, *Psychological factors, *Spacecraft design, *Work-rest cycle, Bibliographies, Body size (biology), Confinement, Extravehicular activity, Human factors engineering, Isolation, Pressure suits, Spacecraft environments

N69-12599 CFSTI Prices: PC\$6.00 MF\$0.95

ABSTRACT:

Anthropometry and the aerospace environment are analyzed in relation to workspace factors, confinement, isolation and sensory deprivation, and activity cycles. The use of percentile as opposed to average or mean values in anthropometric data is emphasized. Body dimensions of U.S. males and Air Force flying personnel are summarized, with detailed tables of anthropometric data of astronauts. Increases in body dimensions from clothing are analyzed followed by an anthropometric study of pressure suit design. Division of workspace into functional compartments is considered.

COMPENDIUM OF HUMAN RESPONSES TO THE AEROSPACE ENVIRONMENT. VOLUME 3 -
SECTIONS 10-16

Lovelace Foundation for Medical Education and Research, Albuquerque,
N. Mex.

AUTHOR: Roth, E. M.

5532C3 FLD: 6S STAR0702

Nov 68 552p

REPT NO: NASA-CR-1205/III/

CONTRACT: NASR-115

Coll- 552 P Refs

DESCRIPTORS: *Anthropometry, *Astronaut performance, *Nutritional
requirements, *Spacecraft cabin atmospheres, *Spacecraft contamination
, Bibliographies, Physiological effects, Potable water, Pressure
effects, Pressure suits, Spacecraft environments

N69-12592 CFSTI Prices: PC\$6.00 MF\$0.95

No Abstract Available

MUSCLE STRENGTH, FLEXIBILITY, AND BODY SIZE OF ADULT MALES

Antioch Coll Yellow Springs Ohio (031300)

AUTHOR: Laubach, Lloyd L., McConville, John T.

506314 FLD: 6N USGRDR6821

14 Apr 65 13p

CONTRACT: AF 33(615)-1101

PROJECT: AF-7184

MONITOR: AMRL-TR-65-107

Availability: Pub. in The Research Quarterly, v37 n3 p384-392 Oct 66.

ABSTRACT: Four measures of muscle strength, two measures of flexibility, 30 anthropometric measures (both direct and indirect), and the somatotypes of 45 male subjects were obtained and the interrelationships among these measures investigated. A low but statistically significant correlation was found between hip flexion strength and the range of motion of hip extension-flexion; however, this was the only strength measurement to correlate significantly with the flexibility measurements. Many statistically significant ($p = .05$) correlations were found between the anthropometric and the strength measurements, but none between the anthropometric and the flexibility measurements. The only somatotype component to correlate significantly with the measures of muscle strength was mesomorphy; the correlations between the somatotype components and the measures of flexibility were insignificant. (Author)

DESCRIPTORS: (*Males, *Anthropometry), Strength, Adults, Muscles, Tables, Joints(Physiology), Tensiometers, Body weight

AD-674 306 CFSTI Prices: PC\$3.00 MF\$0.95

DERMATOGLYPHICS OF CENTRAL ASIAN PEOPLES (DERMATOGLIFIKA NARODOV
SREDNEI AZII)

School of Aerospace Medicine Brooks AFB Tex (317000)

AUTHOR: Khit, G. L.

4944E1 FLD: 6N USGRDR6819

1968 13p

REPT NO: SAM-TT-R-931-0768

Trans. from International Congress on Anthropology and Ethnography
(no. 7) n.p., n.d., Papers, by David L. Wood.

DESCRIPTORS: (*Anthropometry, USSR), Anthropology, Population,
Measurement, Hands, Tables, Anatomy

IDENTIFIERS: Ethnic groups, *Dermatoglyphics

AD-672 803 CFSTI Prices: PC\$3.00 MF\$0.95

ANTHROPOMETRY OF THE HUMAN EAR (A PHOTOGRAMMETRIC STUDY OF USAF FLIGHT PERSONNEL)

Antioch Coll Yellow Springs Ohio (031300)
AUTHOR: Laubach, Lloyd L., Alexander, Milton
4773H4 FLD: 6P USGRDR6816
Jan 68 36p
CONTRACT: AF 33(615)-1101, F33615-67-C-1310
PROJECT: AF-7184
TASK: 718408
MONITOR: AMRL-TR-67-203

ABSTRACT: A technique was developed that enables precisely specified ear dimensions to be measured directly from PhotoMetric slides. Summary statistics for each of the various ear dimensions are presented for a sample of 500 subjects randomly chosen from a total series of 2236 photographic slides collected during the 1957 Anthropometric Survey of USAF Male Flying Personnel. Regression equations for predicting the various ear dimensions from Ear Length and Ear Breadth are presented. A complete intercorrelation matrix for all variables studied in this research is also shown. The reliability and objectivity of the technique are discussed. (Author)

DESCRIPTORS: (*Anthropometry, *Ear), Aviation personnel, Photogrammetry, Measurement, Reliability, Tables, Correlation techniques, Air force personnel

AD-670 869 CFSTI Prices: PC\$6.00 MF\$0.95

STEREOPHOTOGRAMMETRY AS A MEANS OF ANTHROPOMETRY FOR MENTALLY
HANDICAPPED CHILDREN

Illinois Univ., Urbana. Dept. of Civil Engineering. (176 010)

AUTHOR: Weissman, S., Herron, R. E.

4631K3 FLD: 14E, 6N USGRDR6813

Nov 67 71p

REPT NO: Photogrammetry Ser-11

GRANT: PHS-NB-07346-01A1

ABSTRACT: Contents: Introduction and statement of the problem; Review of related literature; Surface area determination; Direct methods; Monophotogrammetric methods -- selection and layout of equipment, arrangement and pose of the subject, review of monophotogrammetric methods; Stereophotogrammetric methods -- selection and layout of equipment, arrangement for stereophotogrammetric approach; Body volume determination; Methods used in present investigation -- the analog stereophotogrammetric approach, experiments and tests, the analytical approach.

DESCRIPTORS: (*Anthropometry, *Photographic techniques),
Photogrammetry, Stereoscopic photography, Children, Body, Surface area
, Photographic equipment, Accuracy, Reviews

PB-178 125 CFSTI Prices: PC\$6.00 MF\$0.95

PHYSIOLOGICAL CHARACTERISTICS OF CHILDREN

Foreign Technology Div Wright-Patterson AFB Ohio (141600)

AUTHOR: Galperin, S. I.

4471B4 FLD: 6P USGRDR6810

22 Sep 67 309p

REPT NO: FTD-HT-67-184

Edited trans. of mono. Fiziologicheskie Osobennosti Detei, Moscow, 1965 243p.

ABSTRACT: Age physiology is an important component of the curriculum on human physiology. This report presents basic patterns and facts on the structure and functions of the body of school age children. Particular attention is paid to the physiological basis of consciousness, unity of the higher neural activity, and the psyche.

DESCRIPTORS: (*Physiology, *Children), Humans, Physical fitness, Growth, Anthropometry, Hygiene, Anatomy, Nervous system, Reflexes, Exercise, Aging(Physiology)

IDENTIFIERS: Translations

AD-666 716 CFSTI Prices: PC\$6.00 MF\$0.95

ANTHROPOMETRIC SURVEY OF THE ARMED FORCES OF THE REPUBLIC OF VIETNAM

Army Natick Labs., Mass. (040 300)

AUTHOR: White, Robert M.

4451G1 FLD: 5I, 6N USGRDR6809

Oct 64 73p

CONTRACT: ARPA Order-267-6

ABSTRACT: An anthropometric survey of military personnel of the Republic of Vietnam was conducted between 28 May and 1 July 1963. Body measurements were obtained on a total series of 2,129 men consisting of 1,225 of the Army, 299 of the Navy, 301 of the Marine Corps, and 304 of the Air Force. Fifty-one measurements were made on each individual. The anthropometric data were analyzed and are presented in this report in the form of statistical values. It was found that the 50th percentile value for the stature of Vietnamese military personnel is equivalent to the 2nd percentile value for United States soldiers, while the 50th percentile value for the weight of Vietnamese is less than the 1st percentile value for United States soldiers. The average Vietnamese is about 5 inches shorter in stature and 43 pounds lighter in weight than the average United States soldier. The results of the survey may be utilized in the engineering design and sizing of clothing and equipment intended for use by the Armed Forces of the Republic of Vietnam. (Author)

DESCRIPTORS: (*Anthropometry, Vietnam), Statistical analysis, Body, Measurement, Clothing, Human engineering, Anthropology, Military personnel

IDENTIFIERS: Sizes(Dimensions)

AD-457 939 CFSTI Prices: PC\$6.00 MF\$0.95

AIRCRAFT INSTRUMENT PANEL PLACEMENT

Human Engineering Labs Aberdeen Proving Ground Md (172850)

Technical note

AUTHOR: Barnes, John A.

431113 FLD: 5E, 1D USGRDR6807

Jan 68 19p

REPT NO: HEL-TN-2-68

ABSTRACT: The placement of the aircraft instrument panel has been governed by the 1947 recommendations of the Armed Forces-NRC Vision Committee. This distance, 28 inches from eye to panel, is not always compatible with present-day aircraft designs. A criterion for determining the placement of the instrument panel is developed and the maximum allowable eye-to-panel distance is given in this paper. (Author)

DESCRIPTORS: (*Instrument panels, *Human engineering), Configuration, Flight instruments, Design, Vision, Anthropometry, Visual acuity, Detection, Probability, Military requirements, Pilots

AD-664 750 CFSTI Prices: PC\$3.00 MF\$0.95

DETERMINATION OF CENTERS OF GRAVITY OF CHILDREN, SITTING AND STANDING

Civil Aeromedical Inst Oklahoma City Okla (084050)

AUTHOR: Swearingen, John J., Young, Joseph W.

4093D1 FLD: 6N, 1B USGRDR6802

Aug 65 17p

MONITOR: FAA-AM-65-23

ABSTRACT: There have been numerous instances in which small children have been thrown out over the top of the seat belt in rough air and airline crashes, indicating that the present seat belt is not a satisfactory restraint device for children 2 to 10 years old. Data defining the location of the center of gravity of children of different ages in the sitting position have not been available and are urgently needed to serve as a basis for developing an improved restraint system for children. To supply these data for design requirements approximately 1,200 children (ages 5 to 18) were balanced on a specially designed center-of-gravity machine in sitting and standing positions. The center of gravity of small children in the standing position will be most useful in the design of flotation equipment. This study shows that the center of gravity for small children sitting in an airline seat is located roughly 5 in. above the seat belt and explains why children slip out over the seat belt during crash decelerations. Complete data of location of centers of gravity along with anthropometric data of the children studied are presented. (Author)

DESCRIPTORS: (*Children, *Center of gravity), (*Anthropometry, Children), Aviation safety, Safety harness, Aircraft seats, Design

AD-661 865 CFSTI Prices: PC\$3.00 MF\$0.95

ANTHROPOMETRIC SURVEY OF THE ARMED FORCES OF THE REPUBLIC OF KOREA

Rowland and Co Haddonfield N J (310300)

Final rept.

AUTHOR: Hart, Gary L., Rowland, George E., Malina, Robert

4083D2 FLD: 6N, 5E, 15E USGRDR6802

Oct 66 121p

REPT NO: R/C-66-30-9

CONTRACT: DA-19-129-AMC-480 (N)

PROJECT: 1T014501B74A

MONITOR: EPT-7

ABSTRACT: Anthropometric and equipment evaluation surveys of the military personnel of the Republic of Korea were conducted between May and November of 1965. Body measurements and equipment evaluation data were obtained on a series of 3,747 men (3,249 Army, 190 Air Force, 141 Navy, and 167 Marine). Fifty-nine body measurement and twenty equipment evaluation measures were made on each individual. Procedures and supporting equipment were developed during the course of the project which permitted the collection of more data with greater accuracy in less time and with greater statistical interpretability than in any other anthropometric survey of record. Of the 59 body measurements taken from Korean soldiers, 39 were directly comparable with data which had been previously collected from U. S. troops. The differences between means of the two samples were statistically significant for 30 of the measures. The means of data from U. S. troops exceeded those of Korean soldiers on 33 of the measures, indicating larger physical size in almost all dimensions. Korean troops expressed themselves on the question: 'Insofar as 'fit' is concerned, the (equipment) supplied by the U. S. Army is' on a seven-point continuum ranging from 'excellent' to 'very poor.' Respondents filled out a questionnaire containing general statements described above as well as more specific items relating to grasping, reaching, and positioning the equipment insofar as comfort and effectiveness were concerned. Subjects rated the smaller, lighter equipment favorably with respect to ease of handling, and reported considerable difficulty using larger weapons and equipment. (Author)

DESCRIPTORS: (*Anthropometry, *Armed forces(Foreign)), South Korea, Human engineering, Logistics, Design, Statistical data, Questionnaires, Attitudes, Military personnel

AD-661 625 CFSTI Prices: PC\$6.00 MF\$0.95

PHYSICAL DEVELOPMENT OF SCHOOL CHILDREN (8-14 YEARS OF AGE) OF THE
KOLA PENINSULA

Joint Publications Research Service, Washington, D. C. (193 300)

AUTHOR: Lapitskii, P. G., Belogorskii, V. Ya., Nemzer, M. P.

4051E4 PLD: 6N USGRDR6801

23 Oct 67 5p

Trans. of Pediatriya (USSR) v46 n8 p80-1 1967.

ABSTRACT: Children can develop equally well both in the south and in the north if they are provided with rational care and the appropriate hygienically based conditions of life and nutrition. For further improving the physical development of the transpolar school children, it is essential, in our view, to (a) continue the vigorous and profound efforts aimed at eliminating the unfavorable natural factors, (b) implement in a more decisive and planned manner sanitation-hygienic measures directed at the rational organization of the school and home environment, and (c) reconsider the time for the commencement and termination of studies and set up vacation schedules in accordance with local conditions. To this end, it is essential to attract large groups of medical and pedagogical workers, as well as the community of the oblast' as a whole. The urgency of solving the problems connected with furthering the physical development of school children in the Far North is increasing commensurately with the tempestuous development of these regions.

DESCRIPTORS: (*Children, *Physical fitness), (*Anthropometry, *Acclimatization), Environment, Nutrition, Adaptation(Physiology), Hygiene, Deficiency diseases, Medicine, Students, USSR

JPRS-43059 CFSTI Prices: PC\$3.00 MF\$0.95

FOOT MEASUREMENTS OF PROPER FIT OF ARMY SHOES

Army Medical Research Lab Fort Knox Ky (039650)
AUTHOR: Freedman, Arthur, Huntington, Everett C., Davis, George C.,
Magee, Richard B., Milstead, Valgene M.
3883B4 FLD: 6P, 15E USGRDR6722
11 Mar 46 172p
REPT NO: 3
PROJECT: T-13, 611
MONITOR: 18
Rept. on proj. 'Fort Dimensions of Soldiers.'

ABSTRACT: A plan was developed to secure as many foot measurements as seemed necessary for the definition of the variety of foot sizes and shapes, on a sufficient number of subjects to be representative of the young, male population of the Army. The selection of the appropriate measurements was made on the basis of the experience accumulated by the Laboratory, and modified in accordance with suggestions offered by the Quartermaster representatives, shoe and last manufacturers, an orthopedist, and an anthropologist. Special effort was made to select and define the dimensions to be measured in such a way that the position of each in space could be described. Accordingly, in general, all length and breadth measurements are referred to a set of rectilinear coordinates by orienting the foot prior to measuring, and, wherever necessary, measurements are referred to definable landmarks on the foot surface or at a standard distance from some constant reference point. Accordingly, the measurements are not in every instance those in current use by the shoe trade. (Author)

DESCRIPTORS: (*Feet, Measurement), (*Shoes, Army personnel),
Anthropometry, Design, Tables

AD-658 682 CPSTI Prices: PC\$6.00 MF\$0.95

SUGGESTED MODIFICATIONS IN THE TURRET OF THE M5A1 TANK TO IMPROVE
GUNNER-COMMANDER'S POSITION, USE OF SIGHTS AND OPERATION OF CONTROL

Army Medical Research Lab Fort Knox KY (039650)

AUTHOR: Roberts, Lester B.

3882D1 PLD: 5E, 19F USGRDR6722

9 Aug 43 27p

MONITOR: 18

ABSTRACT: Space limitations in the turret of the M5A1 tank are such that completely adequate man clearance, based upon the full range of anthropometric measurements of personnel, cannot be obtained. A certain amount of restriction must be accepted. A study of the spatial arrangements of seats, controls, etc., in the present tank suggests, however, that improvements can be secured without interfering with basic functions of the vehicle. In order to demonstrate the possibility of such changes from the standpoint of space requirements and to determine the degree of improvement which may be obtained, modifications were made in an M5A1 tank which are described in this report.

DESCRIPTORS: (*Gun turrets, *Human engineering), Design, Gun sights, Tanks (Combat vehicles), Anthropometry

AD-658 639 CFSTI Prices: PC\$6.00 MF\$0.95

HUMAN FACTORS EVALUATION OF BODY-SUPPORTED AIRCREWMAN'S BUTTOCKS AND CROTCH PROTECTIVE UNITS: (COMPARISONS OF TWO HEIGHTS OF CROTCH PROTECTOR AND THREE SUSPENSION SYSTEMS)

Army Natick Labs Mass Pioneering Research Div (400933)

Technical rept.

AUTHOR: Burse, Richard L.

3824K3 FLD: 6Q, 19D, 5E USGRDR6721

Jan 67 28p

REPT NO: EPR-14

PROJECT: DA-1C024701A121-02

MONITOR: USA-NLABS-TR-68-4-PR

ABSTRACT: The research described was an evaluation of body-supported aircrewmens' buttocks and crotch protective units in which two heights of crotch protector and three different suspension systems were compared with respect to fit, comfort, ease of use, estimated length of time the system could be used and the adequacy of several dimensions of the protective units. In general, both types of protective units and all three suspension systems were equally satisfactory. One type of suspension system and one height of crotch protector were significantly easier to use, however, while both crotch protectors were too wide. Subjects desired that the longer crotch protector be shortened and the shorter crotch protector be lengthened to approximately the same length. This desired change apparently was based on factors other than physical discomfort. (Author)

DESCRIPTORS: (*Body armor, *Human engineering), (*Aviation personnel, Body armor), Design, Acceptability, Flight clothing, Anthropometry

AD-658 034 CFSTI Prices: PC\$6.00 MF\$0.95

BODY VOLUME OF ADULT MEN

School of Aerospace Medicine Brooks AFB Tex (317000)

Rept. for 10 Mar 64-9 Dec 66

AUTHOR: Ward, Chester L.

3771F1 FLD: 6P USGRDR6720

Jun 67 12p

REPT NO: SAM-TR-67-42

PROJECT: AF-7758

TASK: 775801

MONITOR: 18

ABSTRACT: Body composition determinations were made on 404 adult men by use of a volumetric method. The testing of a proposed nomogram for estimation of body volume from height and weight revealed the chart to be biased for adult men. Body volume was found to correlate well with body weight (correlation coefficient of .996). Body volume of men in liters, V, may be estimated from body weight in kilograms, W, by using the formula: $V = -4.7573 + 1.0153 W$. The ideal weight given on the USAF standard weight table was found to have a correlation coefficient of only .672 with calculated percent body fat. (Author)

DESCRIPTORS: (*Anthropometry, Males), (*Body, Volume), Body weight, Lipids, Obesity, Humans, Correlation techniques

AD-657 316 CFSTI Prices: PC\$3.00 MF\$0.95

DEVELOPMENT OF A COMBAT BOOT LAST FOR THAI AND VIETNAMESE MILITARY FORCES

Army Natick Labs Mass Clothing and Organic Materials Div (400237)

Final rept. (Phase 2), 11 Oct 65-20 Jan 66

AUTHOR: Swain, Douglas S.

3665H3 FLD: 15E, 6N USGRDR6718

May 67 27p

CONTRACT: ARPA Order-267

MONITOR: USA-NLABS-TR-67-81-CM

ABSTRACT: The report covers Phase II of work accomplished by the U. S. Army Natick Laboratories, Natick, Massachusetts under Advanced Research Project Agency (ARPA) Order No. 267, Amendment 11 on 'The Development of a Combat Boot Last for Thai and Vietnamese Military Forces.' The program was a joint venture conducted with anthropometric data on Thai and Vietnamese feet originating at the Natick Laboratories, and preliminary tests of lasts and footwear models developed from this study by Jones and Vining, Inc., Brockton, Massachusetts. The Project Officer on this program from the Natick Laboratories, and the representative from Jones and Vining, Inc., were in Thailand and Vietnam from 24 March to 24 April, 1965 at which time they conducted fit and wear tests of combat boots manufactured over the newly-developed last. The tests showed that 99 percent of the Vietnamese/Thai military personnel could be adequately fitted using the new last with minor modifications, which were made. Models and equipment to fabricate the boots were provided to Thailand and Vietnam, U. S. Military Assistance Command. (Author)

DESCRIPTORS: (*Shoes, *Armed forces supplies), Thailand, Vietnam, Japan, United States, Protective clothing, Armed forces research, Wear resistance, Measurement, Anthropometry

AD-655 529 CFSTI Prices: PC\$6.00 MF\$0.95

BODY SEGMENT PARAMETERS

New York Univ., N. Y. Research Div. (401 853)

Final technical rept.

AUTHOR: Drillis, Rudolfs, Contini, Renato

3652J4 FLD: 6P, 6E USGRDR6718

Sep 66 114p

REPT NO: TR-1166.03

MONITOR: 18

ABSTRACT: The procedures outlined provide suitable results for body segment parameter determinations where these are desired on the population for which the study was conducted. The data may be used on other populations but must be applied with judgment. The techniques which were developed for determining body segment parameters, should be used for determining these parameters on other age groups and where there are distinguishable differences in body configuration. These body parameters and the variations therein should have important clinical implications in the functional restoration of the Physically disabled. They should provide clues for improvement of the design of assistive devices, prostheses and orthoses and also provide an additional means for following the progress the therapy prescribed in other pathophysiological situations.

DESCRIPTORS: (*Anthropometry, *Prosthetics), Body weight, Volume, Center of mass, Biophysics, Inertia, Moment of inertia, Density, Population(Mathematics), Casting, Rehabilitation, Stress(Physiology), Tolerances(Physiology), Statistical analysis

IDENTIFIERS: Biomechanics

PB-174 945 CFSTI Prices: PC\$6.00 MF\$0.95

ANTHROPOMETRY OF THE LATIN-AMERICAN ARMED FORCES

Army Tropic Test Center Fort Clayton Canal Zone (042290)

Research rept.

AUTHOR: Dobbins, D. A., Kindick, C. M.

3612H1 FLD: 6N USGRDR6717

May 67 71p

REPT NO: RR-10

PROJECT: DA-1L013001A91A, TECOM-9-6-0069

MONITOR: 18

ABSTRACT: The U.S. Army Tropic Test Center made anthropometric measurements of a sample of Latin-American military personnel in the Canal Zone from September, 1965 to September 1966. A total of 733 trainees were measured--600 airmen at the USAF Inter-American Air Force Academy and 133 army personnel at the US Army School of the Americas. Eighteen Latin-American countries are represented in the sample. The average age for the sample was 23 years, average height was 65.5 inches, and average weight 140 pounds. Percentiles and ranges for 76 physical measurements are presented, including isometric strength and hand-grip measures. Reliability coefficients for strength measurements ranged from .73-.87. Comparisons with Thai and U.S. personnel showed that the Latin-American sample was intermediate between the two on most physical dimensions, however, the Latin Americans were much closer in size to the Thai than to U.S. military personnel. Photographs illustrating various body builds are shown. (Author)

DESCRIPTORS: (*Military personnel, *Anthropometry), Latin America, Strength, Body weight, Clothing, Physical fitness

AD-654 762 CPSTI Prices: PC\$6.00 MF\$0.95

BODY COMPOSITION OF A MILITARY POPULATION FT. CARSON 1963. I. BODY DENSITY, FAT, AND POTASSIUM 40

Army Medical Research and Nutrition Lab., Denver, Colo. (039 600)

Final rept.

AUTHOR: Krzywicki, Harry J., Chinn, Kenneth S. K.

2842E2 FLD: 6 TAB6701

22 Jul 66 22p

REPT NO: USAMRNL-296

PROJECT: 5011-6.11.4501.1

MONITOR: 18

ABSTRACT: Body volumes were measured on 97 soldiers between the ages of 17 - 52 years by water displacement volumetry and corrected for respiratory gas by a nitrogen washout technique. Total body potassium 40 was measured by a NaI crystal low level gamma radiation counter. The subjects were grouped into 5 year age increments and compositional changes were noted to occur in per cent body fat and quantity of body potassium present. Body density decreased with age reflecting an increase in body fat. Total body potassium decreased with age. Both parameters varied independent of body weight and appear age dependent. Eight additional obese subjects were found to have the lowest body density and total body potassium values (gm K/kg body weight). Effective ranking of body fat burden of populations was demonstrated by body volumetry and age differences were noted from potassium 40 counting. A correlation coefficient of $r = 0.731$ was demonstrated between body density and body potassium (gm K/kg body weight). (Author)

DESCRIPTORS: (*Body, Potassium), (*Lipids, Body), Nutrition, Anthropometry, Volume, Body weight, Obesity, Density, Aging (Physiology), Statistical analysis

AD-642 308 CFSTI Prices: PC\$6.00 MF\$0.95

A STUDY OF ONE-HANDED LIFTING

Antioch Coll Yellow Springs Ohio (031300)

Final rept.

AUTHOR: McConville, John T., Hertzberg, H. T. E.

2792G2 PLD: 6M, 5D USGRDR6619

May 66 2p

CONTRACT: AF 33(616)-6792

PROJECT: AF-7184

TASK: 718408

MONITOR: AMRL-TR-66-17

ABSTRACT: The research study is intended to aid in establishing realistic criteria for size and weight of industrial packages. Size and weight, objective and subjective factors that potentially affect human weight-lifting, and proper approach to the design of industrial loads are discussed. Additional programs of investigation that would clarify other aspects of the problem are outlined. This study examined the interaction of two variables--weight and width--of one--handled, symmetrical boxes that a sample of 30 adult males were able to lift from the floor to a table 30 inches high. No carrying was involved. The subject sample was chosen to be a reasonable representation by height and weight of the U. S. Air Force Population. All lifts were made with the preferred hand under 'ideal' laboratory conditions. Box width was varied from 6 to 32 inches. The maximum weight of box that subjects were able to lift varied linearly, but inversely, with the width of the box. From this sample, the maximum weight that 95% of the population would be able to lift--but not necessarily carry--can be expressed by a linear equation: $Y = 60 - X$, where Y is the weight (in pounds) of the package to be lifted and X is the width (in inches). The numerical values of this formula provide a recommended upper limit on the design of industrial or military equipment which must be lifted under ideal conditions. If the expected conditions of use are less than ideal, or if carrying for appreciable distances is likely to be necessary, reasonable reductions in weight, or size, or both should be made by the manufacturer. (Author)

DESCRIPTORS: (*Strength, Males), (*Anthropometry, Air force personnel), Muscles, Weight, Packaging, Air force equipment, Human engineering

AD-637 764 CPSTI Prices: PC\$3.00 MF\$0.95

RELATIONSHIPS BETWEEN FLEXIBILITY, ANTHROPOMETRY, AND THE SOMATOTYPE
OF COLLEGE MEN

Antioch Coll Yellow Springs Ohio (031300)

AUTHOR: Laubach, Lloyd L., McConville, John T.

2771J3 FLD: 6M USGRDR6620

1966 2p

CONTRACT: AF 33(615)-1101

PROJECT: AF-7184

TASK: 718408

MONITOR: AMRL-TR-65-31

Availability: Published in Research Quarterly v37 n2 p241-51 May
1966.

ABSTRACT: Fourteen flexibility measurements, 63 direct and derived anthropometric measurements, and the somatotypes of 63 college men, mean age of 19.0 years, were obtained in order to assess the relationships between flexibility and anthropometric measurements, anthropometric measurements and somatotypes, and flexibility and somatotype. The correlations between the flexibility measurements and the anthropometric measurements were low and mostly insignificant. Body fat, as measured by skinfold calipers, yielded fairly high significant negative correlations with the flexibility measurements. The correlations between the flexibility measurements and somatotype were insignificant. Generally high correlation coefficients were obtained between the anthropometric measurements and somatotype. (Author)

DESCRIPTORS: (*Anthropometry, Students), Universities, Anatomy, Body weight

AD-638 282

HUMAN BODY DENSITY AND FAT OF AN ADULT MALE POPULATION AS MEASURED BY
WATER DISPLACEMENT

Army Medical Research and Nutrition Lab Denver Colo (039600)
AUTHOR: Krzywicki, Harry J., Chinn, Kenneth S. K.
2731L3 PLD: 6 USGRDR6621
21 Jul 66 2p
REPT NO: 297
PROJECT: da-3A014501B71R
TASK: 92

ABSTRACT: Body volume was measured on 14 male adults at 7 intervals during a 24 hour period using a water displacement technique. The variation in body densities fell within the accepted limits of error propagated by the technique. Body densities were also performed on 173 male adults ranging between the ages of 17-69. Values were effectively ranked in terms of age and body fat, demonstrating a continued increase in body fat with an increase in age. These values were independent of body weight. The human body volumeter is a simple, rapid and effective device which compares favorably with the underwater weighing technique for estimating body density in large populations. The precision for estimating body fat is +0.488 kg when the residual lung volume is measured but is reduced to 1.52 kg when the volume is estimated. (Author)

DESCRIPTORS: (*Body, *Lipids), Body weight, Aging(Physiology), Volume, Density, Anthropometry, Males

AD-639 241 CFSTI Prices: PC\$3.00 MF\$0.95

A STUDY OF THE INTERRELATIONSHIPS OF PSYCHOLOGICAL AND PHYSIOLOGICAL MEASURES ON SUBMARINE ENLISTED CANDIDATES: I. HISTORY, EXPERIMENTAL DESIGN, AND STATISTICAL TREATMENT OF DATA

Naval Medical Research Lab New London Conn (249700)

AUTHOR: Cock, Ellsworth B., Wherry, Robert J.

2713L3 PLD: 6M, 5H, 5I USGRDR6622

9 Mar 49 2p

REPT NO: MRL-142

MONITOR: NAVMED-NM-003-017-1

Prepared in cooperation with Ohio State Univ., Columbus.

ABSTRACT: Some 330 physiological and psychological measures were obtained on a population of 120 submarine enlisted candidates. The purpose and background of the main problem (that of making the submarine selection program more objective) is presented, and current screening measures are discussed together with additional indices included for purposes of comparison. The 330 measurements were subdivided into logical subject matter fields and factor analyzed. Areas covered included physical fitness tests, urinary 17-ketosteroid and androgen output and stress tolerance, psychiatric interview, Rorschach, physical characteristics, anthropometric and somatotyping data, blood data and psychological tests. This paper is designed to facilitate reading of later reports in the series, and to this purpose, a detailed discussion of the nature of the correlation coefficient and the technique of factor analysis is included in the appendix material.

DESCRIPTORS: (*Submarine personnel, Selection), Physical fitness, Medical examination, Psychiatry, Psychometrics, Projective techniques, Stress(Physiology), Stress(Psychology), Anthropometry, Blood counts, Visual acuity, Color vision, Pitch discrimination, Audiometry, Personality, Factor analysis

AD-639 630 CFSTI Prices: PC\$3.00 MF\$0.95

SELECTED FACIAL MEASUREMENTS OF CHILDREN FOR OXYGEN-MASK DESIGN

Civil Aeromedical Inst Oklahoma City Okla (084050)

AUTHOR: Young, Joseph W.

2695A1 FLD: 6J, 6M USGRDR6622

Apr 66 2p

MONITOR: AM-66-9

ABSTRACT: Requirements for desing of oxygen masks and other equipment for effective protection of children in high-altitude flight necessitate a new facial-measurement series. A program to meet this demand was initiated to (1) select a basic set of standard measurements, (2) define and standardize new measurements of specific structural features based on well-defined or established anatomical landmarks, (3) conduct a series of surveys on selected representative children of all ages, and (4) determine significant dimensional ranges of facial structures for use as standardized design criteria. The new series provides 10 standard and 8 new facial measurements, all of which are dimensionally related to other common measuring points to permit a comparison with other series of facial measurements. This survey is based upon a selected population of 978 Caucasian subjects of ages 1 month through 17 years. The number of subjects in each age and sex group was controlled to assure constant sample distribution throughout the series. A continuation of this suty is proposed to include representative populations for both the Negro and Mongoloid types. (Author)

DESCRIPTORS: (*Oxygen masks, Design), (*Children, Oxygen masks), (*Anthropometry, Children), (*Face, Measurement), Infants, Adolescents, Head

AD-640 062 CFSTI Prices: PC\$3.00 MF\$0.95

ANTHROPOMETRY OF COMMON WORKING POSITIONS

Aerospace Medical Research Labs Wright-Patterson AFB Ohio (009850)

Final rept., Jul 61-Jul 62

AUTHOR: Alexander, Milton, Clauser, Charles E.

2603A4 FLD: 5D, 6M USGRDR6612

Dec 65 2p

REPT NO: AMRL-TR-65-73

PROJECT: af-7184

TASK: 718408

ABSTRACT: Twenty-six dimensions of the human body in various working positions (standing, bending, kneeling, squatting, supine, and sitting) were obtained by photography or by direct measurement. The purpose of the study was to provide the human engineer with anthropometric data of various missile worker's positions so that more adequate work stations can be designed. Each dimension is defined verbally and graphically; and the 5th, 25th, 50th, 75th, and 95th percentiles and other statistical data are presented. (Author)

DESCRIPTORS: (*Anthropometry, *Posture), (*Human engineering, Guided missile personnel), Photogrammetry, Measurement

AD-632 241 CFSTI Prices: PC\$3.00 MF\$0.95

THOUSAND AVIATOR STUDY: NONVESTIBULAR CONTRIBUTIONS TO POSTURAL
EQUILIBRIUM FUNCTIONS

Naval Aerospace Medical Inst Pensacola Fla (400580)

AUTHOR: Fregly, Alfred R. , Oberman, Albert, Graybiel, Ashton,
Mitchell, Robert E.

2544F1 FLD: 60, 6R USGRDR6614

17 Mar 66 2p

REPT NO: NAMI-956

CONTRACT: nasa order-R-136

MONITOR: NAVMED MF022.03.02-5007-10

Research supported in part by PHS.

ABSTRACT: In a preliminary study of nonvestibular sources of variance in the postural equilibrium functioning of a group of middle-aged males, twenty-eight of thirty-eight selected measures were shown to be related to one or another of three postural Criteria. Outstanding among these, in descending order of magnitude, are: abdominal circumference, age, endomorphy, heart rate immediately after exercise, and duration of cigarette smoking. These and other findings are discussed in terms of their implications for vestibular and gerontological research. (Author)

DESCRIPTORS: (*Equilibrium, *Posture), Aging(Physiology), Medical examination, Aviation medicine, Space medicine, Correlation techniques , Anthropometry, Pulse rate, Exercise, Tobacco, Smokes

AD-633 629 CPSTI Prices: PC\$3.00 MF\$0.95

THE THOUSAND AVIATOR STUDY: SMOKING HISTORY CORRELATES OF SELECTED
PHYSIOLOGICAL, BIOCHEMICAL, AND ANTHROPOMETRIC MEASURES

Naval Aerospace Medical Inst Pensacola Fla (400580)
AUTHOR: Lane, Norman E., Oberman, Albert, Mitchell, Robert E.,
Graybiel, Ashton
2504C3 FLD: 6C, 5H USGRDR6615
27 Apr 66 2P
REPT NO: NAMI-961
CONTRACT: nasa order-R-136
MONITOR: NAVMED-MF022.03.02-5007.11
See also AD-625 854, AD-631 554.

ABSTRACT: The Pensacola Thousand Aviator Study began in 1940 with the examinations of 1056 student aviators and flight instructors on a variety of physiological, psychological, and socio-economic parameters. Follow-up examinations on the group were conducted in 1951, 1957, and 1963. During the 1963 follow-up, smoking history information on 675 subjects was obtained by questionnaire and confirmed by interview, together with concurrent data from clinical examinations, laboratory tests, anthropometry, and personal history variables. Two smoking variables were created, Cigarette Amount (CA) and Cigarette Years (CY), each on a scale of 1 to 5 points. From the concurrent data, 62 variables were selected for relevance and general interest to be examined in relation to smoking. Twenty-four of the 62 variables had significant correlations ($p < .05$) with CA, and 16 showed significant relationships to CY. Findings are related briefly to previous research, and problems of cause-effect isolation are mentioned. It is concluded that results in general support previous findings on smoker-nonsmoker differences. Contributions of the study in delineating areas of research for longitudinal investigation are discussed. (Author)

DESCRIPTORS: (*Medical examination, Naval personnel), (*Naval personnel, Selection), (*Aviation personnel, Selection), Psychometrics, Anthropometry, Tobacco, Physiology, Biochemistry, Aviation medicine, Cardiography, Lipids, Embolism, Lungs, Blood pressure

IDENTIFIERS: Smoking, Cigarettes

AD-634 612 CPSTI Prices: PC\$3.00 MF\$0.95

THE THOUSAND VIATOR STUDY - SMOKING HISTORY CORRELATES OF SELECTED
PHYSIOLOGICAL, BIOCHEMICAL, AND ANTHROPOMETRIC MEASURES

Naval School of Aviation Medicine, Pensacola, Fla.

AUTHOR: Graybiel, A. , Lane, N. E., Mitchell, R. E., Oberman, A.

0984E2 FLD: 6P STAR0416

27 Apr 66 20p

REPT NO: NASA-CR-75902, NAMI-961

CONTRACT: NASA ORDER R-136

DESCRIPTORS: *Anthropometry, *Biochemistry, *Physiology, *Tobacco,
Blood, Diastolic, Factor, Protein, Skin, Smoke, Social factor,
Systolic, Vascular

N66-29574 CFSTI Prices: PC\$6.00 MF\$0.95

ABSTRACT:

During the 1963 follow-up examination in the Pensacola Thousand Aviator Study, smoking history information was obtained by questionnaire on 675 subjects. Concurrent data were collected from clinical examinations, laboratory tests, anthropometry, and personal history variables. Two smoking variables were created. Cigarette Amount (CA) and Cigarette Years (CY), each on a scale of 1 to 5 points. From the concurrent data, 62 variables were selected for relevance and general interest to be examined in relation to smoking. Twenty-four of the 62 variables had significant correlations with CA and 16 showed significant relationships to CY. Findings are related briefly to previous research, and problems of cause-effect isolation are mentioned. It is concluded that results in general support previous findings on smoker-nonsmoker differences. Contributions of the study in delineating areas of research for longitudinal investigation are discussed.

RELATIVE PERFORMANCE FOR CRANKING A HAND WHEEL AT DIFFERENT POSITIONS
ON A VERTICAL SURFACE

Industrial Engineering Lab., New York Univ., N. Y.

Technical rept.

AUTHOR: Sandberg, K. O. William, Lipschultz, Harold L.

0633B1 FLD: 5E USGRDR4123

18 Apr 48 25p

CONTRACT: N5ori-166(01)

MONITOR: SPECDEVCECEN-TR-166-I-22

ABSTRACT: The investigation measured the speed with which subjects can crank a hand wheel at different positions on a vertical surface. Eleven male subjects were used. During all tests, the subjects were seated in a straight-backed chair whose back was 24 in. from the vertical surface. Test positions were spaced at 4-in. intervals vertically and horizontally and covered a total area of 44 in. (vertically) and 40 in. (horizontally). In general, the areas of best performance for the left hand were higher on the vertical surface than similarly rated areas for the right hand. The optimum areas (95% of maximum performance) for each hand are below eye level and on the same side of the body mid-line as the hand being used. The relative performance at all test positions is charted. No conclusive relationships were found between cranking performance and certain body dimensions of operators. (Author)

DESCRIPTORS: (*Instrument panels, Human engineering),
Performance(Human), Hands, posture, Test methods, Measurement,
Anthropometry, Rotation

AD-144 672 CFSTI Price: PC\$6.00

STUDY OF MONKEY, APE, AND HUMAN MORPHOLOGY AND PHYSIOLOGY RELATING TO
STRENGTH AND ENDURANCE. PHASE IX. THE STRENGTH TESTING OF FIVE
CHIMPANZEE AND SEVEN HUMAN SUBJECTS

Chicago Univ., Ill. (082 450)

Final rept.

AUTHOR: Edwards, William E., Clarke, Thomas Erskine

063213 FLD: 6P, 6C USGRDR4123

Aug 65 29p

CONTRACT: AF 29(600)-3466

PROJECT: AF-6892

TASK: 689201

MONITOR: ARL-TR-65-15

ABSTRACT: Five chimpanzees (two immature of each sex and one adult male) were trained for testing of elbow flexion strength. Resulting scores were compared with those of seven young (20 to 37 years) adult human males. The apes manifested a 2-1/2 fold superiority by body-weight and, sex and age equivalent, an appreciable superiority by brachial cross-sectional area. (Author)

DESCRIPTORS: (*Chimpanzees, Strength), (*Physical fitness, Humans), Performance(Human), Physiology, Muscles, Test methods, Anthropometry, Anatomy, Fatigue(Physiology), Endurance

AD-469 585 CFSTI Prices: PC\$6.00 MF\$0.50

ANATOMY FOR PLANNERS I. LIST OF LITERATURE

National Swedish Inst. for Building Research, Stockholm.

0582L1 FLD: 13M, 6N, 5E USGRDR4120

Aug 65 123p

REPT NO: 20:1965

MONITOR: 18

Sponsored by a grant from the Research Fund.

ABSTRACT: When studying various questions pertaining to building design and equipment units the necessity of an exact knowledge of the dimensions of the human body at rest and in motion constantly recurs. In the course of such studies an inventory of the literature comprising 928 different articles on body measurements was completed. The majority come from the four groups most interested in such measurements, namely military organizations, researchers of race-biological problems, ready-made clothing manufacturers and motor-car manufacturers. In addition to bibliographical particulars, data of statistical interest, such as number and type of persons tested, sample and standard deviation of body dimensions are presented in tabular form. Summaries are also given for most of the papers. In one table the material has been divided into two main categories: 'The Human Being' and 'The Dwelling'. The former comprises anthropological and functional dimensions etc. and the later deals with furnishings, free surfaces, space and studies of dwelling-habits. (Author)

DESCRIPTORS: (*Anthropometry, Reviews), (*Buildings, Anthropometry), (*Anatomy, Human engineering), Body, Measurement, Bibliographies, Abstracts, Sweden

PB-169 934 CPSTI Prices: PC\$12.60 MF\$0.75

STUDY OF DIMENSIONS re EQUIPMENT IN HOUSING FOR OLD PERSONS

National Swedish Inst. for Building Research, Stockholm.

0501K4 PLD: 13M, 5E USGRDR4116

1965 61p

REPT NO: 19:1965

MONITOR: 18

Sponsored by grant from the Research Fund.

ABSTRACT: The study comprised (a) a field study during the course of which certain facts emerged regarding the physical agility and measurements of a large group of old persons, some of whom were selected as test cases, and (b) laboratory studies when a series of suitable dimensions in respect of household fixtures were adopted for the test cases. The results of these studies have been compared with dimensions currently recommended in Sweden and other countries.

DESCRIPTORS: (*Housing, Management planning), (*Human engineering, Housing), (*Aging(Physiology), Humans), Buildings, Measurement, Anthropometry, Positioning reactions, Motion, Kitchen equipment + supplies, Sweden

PB-169 931 CPSTI Prices: PC\$6.00 MF\$0.75

COCKPIT DESIGN STUDIES; STANDARD COCKPIT MOCKUP: SELECTION OF SUBJECTS
FOR AIRCREW STATION DESIGN EXPERIMENTATION

Naval Air Material Center, Philadelphia, Pa. Air Crew Equipment Lab.

AUTHOR: Gifford, E. C., Gaito, J.

0493C2 FLD: 5E, 6N, 1C USGRDR4115

12 Feb 57 16p

REPT NO: NAMC-ACEL318

PROJECT: TED-NAM-AE-7052-Pt-1

MONITOR: AD-123 424

ABSTRACT: The results of the use of the factor analysis technique as an aid in selecting subjects for aircrew station design experimentation are reported. As a prelude to an investigation concerning the effects of various equipment such as the full pressure suit on operational performance, eleven morphological features were selected which were considered critical in defining Cockpit dimensions and arrangement and location of various equipment. However, the probability of obtaining subjects who would fall at approximately the same percentile points, relative to a specific population, in each of these features is extremely small. By the use of factor analysis, it was determined that three basic factors were present and the morphological feature or features with the highest loading on each single factor were selected to represent that factor. This technique allowed the use of a more economical procedure which requires that subjects fall at approximately the same percentile points in five morphological features. (Author)

DESCRIPTORS: (*Cockpits, Design), (*Human engineering, Cockpits), (*Anthropometry, Aviation personnel), Factor analysis, Selection, Pressure suits, Morphology(Biology)

PB-169 222 CFSTI Prices: PC\$1.00 MF\$0.50

ANTHROPOMETRY OF AIR TRAFFIC CONTROL TRAINEES

Civil Aeromedical Research Inst., Oklahoma City, Okla. (084 050)

AUTHOR: Snow, Clyde C., Snyder, Richard G.

0491J4 FLD: 6N, 5I USGRDR4115

Sep 65 26p

MONITOR: AM-65-26

ABSTRACT: The report presents the body measurements of 684 air traffic control trainees enrolled in training programs conducted at the Federal Aviation Agency Aeronautical Center at Oklahoma City between August 12, 1960, and June 30, 1961. It includes the means, standard deviations, coefficients of variation, percentiles, and related statistics of 60 standard anthropometric and functional measurements. The survey was initiated to provide adequate criteria for improving the workspace design for the air traffic controller and to provide anthropometric baseline data for future biometric and aging studies of Air Traffic Service personnel. (Author)

DESCRIPTORS: (*Air traffic controllers, Anthropometry), (*Anthropometry, Statistical analysis), Measurement, Analysis of variance, Students, Aviation medicine, Aging (Physiology), Training, Human engineering

PB-169 870 CFSTI Prices: PC\$6.00 MF\$0.50

DETERMINATION OF CENTERS OF GRAVITY OF CHILDREN, SITTING AND STANDING

Civil Aeromedical Research Inst., Oklahoma City, Okla. (084 050)

AUTHOR: Swearingen, John J., Young, Joseph W.,

0471G1 PLD: 6N, 1C, 13L USGRDR6612

Aug 65 14p

MONITOR: AM-65-23

ABSTRACT: There have been numerous instances in which small children have been thrown out over the top of the seat belt in rough air and airline crashes, indicating that the present seat belt is not a satisfactory restraint device for children 2 to 10 years old. Data defining the location of the center of gravity of children of different ages in the sitting position have not been available and are urgently needed to serve as a basis for developing an improved restraint system for children. To supply these data for design requirements approximately 1,200 children (ages 5 to 18) were balanced on a specially designed center-of-gravity machine in sitting and standing positions. The center of gravity of small children in the standing position will be most useful in the design of flotation equipment. This study shows that the center of gravity for small children sitting in an airline seat is located roughly 5 in. above the seat belt and explains why children slip out over the seat belt during crash decelerations. Complete data of location of centers of gravity along with anthropometric data of the children studied are presented. (Author)

DESCRIPTORS: (*Aircraft seats, Safety harness), (*Safety harness, Children), (*Children, Center of gravity), Seats, Anthropometry, Aviation accidents, Safety

PB-169 873 CFSTI Prices: PC\$1.60 MF\$0.50

SPACE SUIT: DETERMINATION OF THE GEOMETRY AND MINIMUM VOLUME OF THE ENVELOPE REQUIRED FOR DONNING AND DOFFING OF. GEOMETRIC AND VOLUMETRIC DETERMINATIONS OF THE MINIMAL ENVELOPE FOR DONNING THE FULL PRESSURE SUIT

Naval Air Material Center, Philadelphia, Pa. Air Crew Equipment Lab.

AUTHOR: Lowi, Bertram H., Provost, Joseph R.,

0451H1 FLD: 6K, 22A USGRDR6610

1 Jul 63 59p

REPT NO: NAEC-ACEL-503

TASK: RAE-13C-005/2001/R005-01-01

ABSTRACT: Upon the request of the National Aeronautics and Space Administration (Manned Spacecraft Center), an investigation was conducted to determine the geometry and internal volume of the minimal envelope for donning the full pressure suit. Specialized techniques were evolved to achieve a systematically variable, transparent, rigid encapsulation of the subject, as well as a parallax-free method for determining the gross three-dimensional excursions of the suit/body silhouette from the nominal configuration. The precise limits of the donning geometry were determined using photoanalysis techniques. Subsequent to the determination of donning geometry, the internal volume was systematically reduced in step-wise decrements along the spherical diameters from the seat reference point, and at each decrement, time to don was recorded. Volumetric and geometric determinations were made on 5th and 95th percentile subjects. (Author)

DESCRIPTORS: (*Pressure suits, Space flight), (*Space flight, Pressure suits), (*Human engineering, Pressure suits), Flight clothing, Photographic analysis, Anthropometry

AD-410 471 CFSTI Price: PC\$5.60

THE ANGLE OF SHOULDER SLOPE IN NORMAL MALES AS A FACTOR IN
SHOULDER-HARNESS DESIGN

Civil Aeromedical Research Inst., Oklahoma City, Okla. (084 050)

AUTHOR: Snow, Clyde C., Hasbrook, A. Howard,

0341H1 FLD: 6P USGRDR6606

Mar 65 5p

MONITOR: AM-65-14

ABSTRACT: In order to establish criteria for more comfortable shoulder-harness design, this study was conducted to determine the angle of slope of the top of the shoulders where poorly fitting shoulder harness may produce discomfort and, occasionally, functional impairment through compression of the underlying soft tissues. The mean shoulder-slope angle (measured from the vertical body axis) of normal males based on this study of 55 Air Traffic Service trainees is 67.5 degrees with a standard deviation of 5.0 degrees. (Author)

DESCRIPTORS: (*Anthropometry, Aviation personnel), (*Safety harness, Design), Joints(Physiology), Arms, Flight clothing, Pilots, Males, Statistical analysis

PB-169 175 CPSTI Prices: PC\$1.00 MF\$0.50

SOME ADVANCES IN THE STATISTICAL ANALYSIS OF HUMAN VARIATION

Louisville Univ., Ky. Twin Study.

AUTHOR: Vandenberg, Steven G.,

0331F2 FLD: 6C, 5J USGRDR6605

Feb 65 22p

REPT NO: RR-6

GRANT: PHS-MH-18382, PHS-MH-00843

Prepared for presentation for the Conference on the Biology of Human Variation 11-13 Feb 65, New York Academy of Sciences.

DESCRIPTORS: (*Genetics, Statistical analysis), (*Behavior, Genetics), Growth, Humans, Biometry, Children, Anthropometry, Environment, Factor analysis, Correlation techniques, Programming(Computers)

PB-169 002 CFSTI Prices: PC\$6.00 MF\$0.50

INTEGRATED ANTHROPOMETRIC DEVICE

Patent assigned to Navy

AUTHOR: Provost, Joseph R., Gifford, Edmund C., Lazo, John

0243J4 FLD: 14B, 5E, 22B USGRDR4019

27 Jul 65

MONITOR: 18

Available from Commissioner of Patents, Washington, D.C., 20231, \$0.25

ABSTRACT: The measuring device is designed to obtain the sitting height, the shoulder breadth, the sitting shoulder height, the buttock-knee length, the buttock-leg length and the standing height of air crew personnel. These measurements are required for designing the workspaces and the control-display configurations in space vehicles.

DESCRIPTORS: (*Anthropometry, Instrumentation), Spacecraft, Astronauts, Body, Aviation personnel, Measurement, Human engineering, Patents

Patent 3,196,551